The Builder.

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Examples of French Woodcarving.

WOODCARVING, and the objects on which woodcarving is bestowed, form a kind of link between purely architectural detail and purely decorative or ornamental work. In the stalls of a cathedral or church it becomes almost a portion of the architecture of the interior; it in fact takes on itself, very often, an elaborate mimicry of built-up architectural forms; or, if introduced in the roof timbers, it becomes an integral portion of the structure. On the other hand, it may appear merely as surface ornament on the panel of a box or casket, having no relation with architectural forms beyond the fact of being framed within a panel moulding. A material with a fibre running one way, moreover, has its own practical limitations in regard to working; there are many forms suitable for carving in stone which are not suitable for wood, though they are often imitated in that material. So that the consideration of examples of wood carving often raises questions both of an æsthetic and practical nature.

The study of old examples shows a great deal of this kind of cross-purpose in carved woodwork. In the present day there is rather more of a settled feeling in favour of treating woodwork in a special manner suitable to the material. In looking over old examples we find, especially during the late Mediæval period, a considerable amount of carved woodwork imitating stone architectural forms. In the great age of stone-built architecture the forms of that architecture had so taken possession of men's minds that they seemed to pervade everything; silver-gilt shrines and wooden screens alike had their buttresses and pinnacles. And in the first fervour of the Renaissance the columnar order also, like the buttress before it, would be everywhere, and intruded itself into woodwork where it had no right place. As the overpowering influence of architecture, Gothic or Classic declined, we find in the later days of the Renaissance that woodcarving freed itself much more from architectural precedents, and developed a purely decorative treatment of its own.

This is perhaps especially exemplified in the case of French woodcarving, where the architectural forms are remarkably prevalent in the Mediæval work, and remarkably absent, by comparison, in the late Renaissance work. For other reasons French woodcarving is of special interest. It presents, taken all round, the finest collection of European work of that kind; and in that of the Renaissance period there is an interesting mingling of a distinctly French taste, which was never lost, and which asserted itself most strongly in the later Renaissance period, combining with the results of Italian influence.

The collection of a large portfolio of photographic reproductions of French woodcarving in our national museums, edited by the Manager of the School of Art Woodcarving at South Kensington,* affords not only a valuable repertory of examples to stimulate the taste and ambition of the artisan, but also a very agreeable means of studying and comparing a number of fine and interesting examples, in illustrations which are so effective and on so large a scale as to make the best possible substitute, at all events, for the study of the actual works. Even the grain of the wood, in many of the plates, is quite clearly reproduced; and in a good many of the plates full-size profiles of the moulded portions are added. Altogether the portfolio is one of the finest illustrative publications of woodcarving which has been produced.

These examples are chiefly taken from the collection of French woodwork purchased by the South Kensington authorities in 1895, and now divided among our various national museums. The three series comprise (1) work of the late fifteenth and early sixteenth century, (2) work of the sixteenth century, and (3) work of the seventeenth and eighteenth centuries. The classification according to date has been no easy matter. On the advice of several French experts, the Editor determined, in a general way, to divide each century into "early," "middle," and "late," and "when a king's name is mentioned it is to suggest that the design and carving are typical of the style prevailing during his reign, rather than to assert that the work was actually carried out during his lifetime." In treating of the later Renaissance it is still more difficult to set up exact landmarks, and Miss Rowe quotes from an article in the "Dictionary of Architecture" to the effect that the only logical thing to do is to subdivide the reign of Louis XIV. into six periods, that of Louis XV. into eight, and that of Louis XVI. into three, and call each after the artist or person whose name was paramount. The South Kensington authorities must have found the same difficulty; they have ignored it, in the case of one group in their collection, by the comprehensive phrase "latter half of sixteenth century;" but at this moment there is standing in the furniture gallery a cupboard door panel carved with a festoon of delicate foliage, immediately over a boldly designed coffer front (splendidly illustrated in No. XXIII. of Miss Rowe's plates) of great breadth of style—large surfaces, bold sweeps of line—which looks as if it belonged actually to a different century from the door above it; but both are labelled "early sixteenth century." It seems impossible to assign these two pieces of work to anything near the same period. Have the Museum people made a mistake in their dating of the first-named specimen? It looks rather as if that were the real solution.

The first example in the First Series, an oak coffer of the fifteenth century, the original of which is in the Dublin Museum, is from Northern France, and is noteworthy as exhibiting a much less architectural and a much more characteristically "wooden"

* "French Woodcarvings from the National Museums: Printed in Collotype from Photographs specially taken. Edited by Eleanor Rowe, Manager of the School of Art Woodcarving, South Kensington. First, Second, and Third Series. London: B. T. Batsford; 1896-1897.

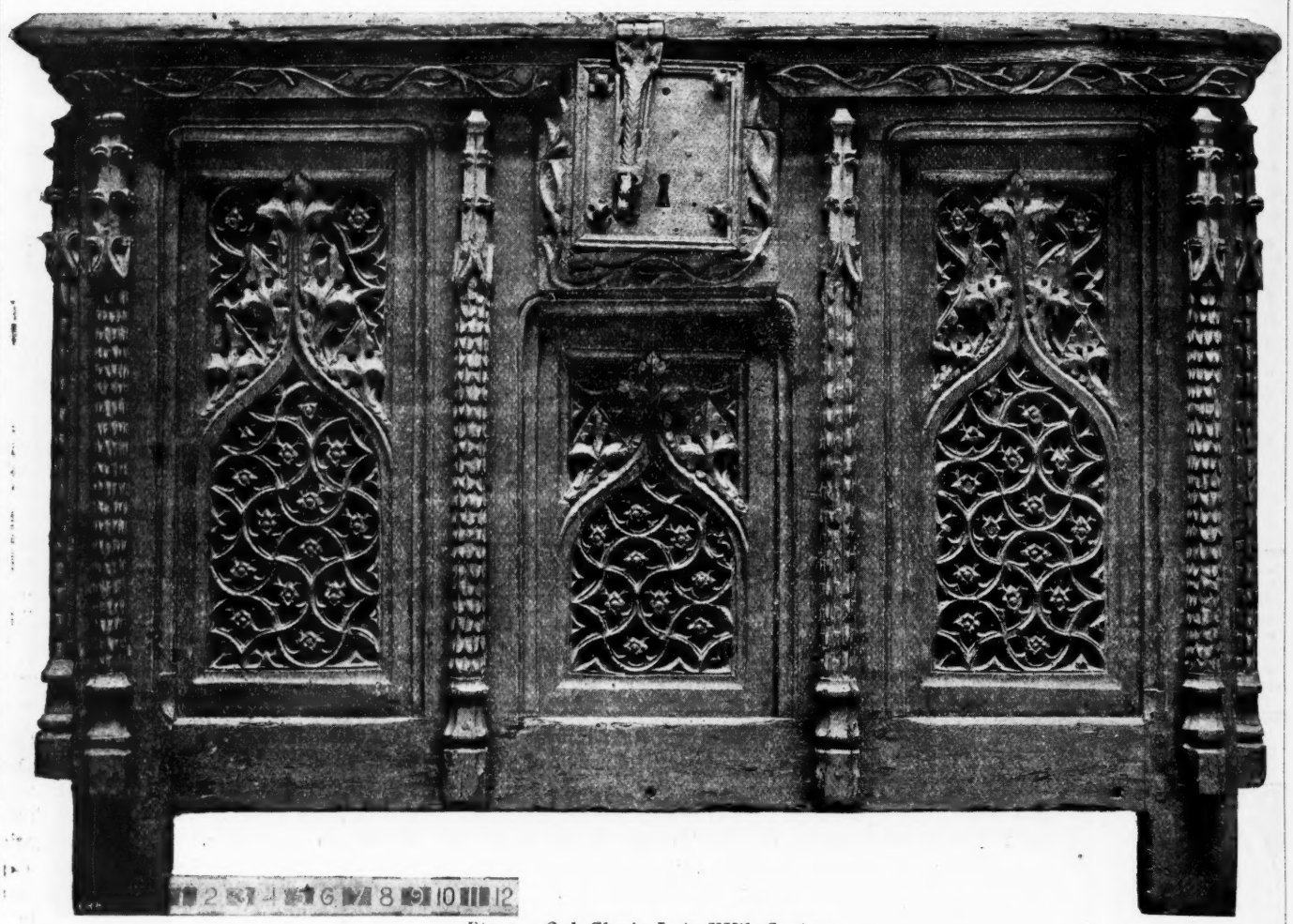


Fig. 1.—Oak Chest: Late XVth Century.

treatment than most of the Gothic examples. The carving is disposed in simple panels hardly even defined by moulding, and the larger portion of it consists of a carved thistle ornament treated with much vigour. Possibly its neighbourhood may have something to do with its greater simplicity of style and treatment. At all events one cannot help being struck by a similar contrast among the later French work at South Kensington. Alongside of one or two highly elaborated late sixteenth-century cabinets with a good deal of architectural detail, is an example from Normandy, of the same date and the same general type of design, but curiously coarse and thick in detail compared with the more central work of the same date. To return to the portfolio; we find several plates of objects in which carved tracery, of exactly the same type as the stone tracery of the period, forms the principal source of effect; a kind of ornament certainly not specially suited to woodwork. Plate VII. contains the remarkable chest of which we give a reduced copy in fig. 1. Here again we find tracery, of the Flamboyant type, to which a curiously oriental effect is imparted by the small flower ornaments which stand free within the compartments of the tracery; and here we find the application of the buttress or pinnacle, but not in its usual architectural form; no cut-out set-offs are introduced, but the buttress takes the form of a kind of attached colonnette with a surface decoration. Miss Rowe quotes Mr. Pollen's remark on this example (which is in the South Kensington Museum) to the effect that "the little buttresses are scaled in the fashion of the fifteenth century woodwork, when tile-coverings or any sort of decorative reticulation that enriched the surface of woodwork were adopted as ornaments." This view would connect the ornament of the buttresses directly with architectural detail; but we doubt if this is the case; it seems a natural manner of decorating a colonnette of this kind. We do not quite understand the editor's remark, "the crockets in this spring from the outer moulding of the arch, which dies into the margin. The effect of this is very good, as it avoids carrying the hollow moulding round the panel." There is nothing unusual in the manner of springing of the crockets; and the hollow moulding is carried round the panel, though interrupted by the springing of the arch. The next plate (VIII.) again impresses one with the difference in the character of Northern French work of this class; in general aspect the design looks a great deal earlier than the last named; the arches of the compartments are round, or rather segmental, and the colonnettes chevroned and otherwise ornamented in quite a Norman manner; the Flamboyant character of the tracery between them, however, fixes the late date. Several other traceried examples follow, and then a German one (why introduced here we know not), a cupboard door of oak, in which the exceedingly free and bold treatment of the ornament, founded on floral forms but very highly conventionalised, is an example of purely wood character of work, and certainly throws into the shade all the French traceried patterns in the other examples. Some early sixteenth-century examples at the close of the First Series are very interesting as showing us the early form of French Renaissance floral detail, graceful and symmetrical in line, yet far more free and much nearer to natural forms than the later Renaissance examples.

With the Second Series we come into the Francis I. period, with its favourite scroll-work in panels, of which the first example Plate XIX. is a singularly interesting and beautiful one, in which the whole surface is covered with freely-flowing spiral stems with leaves springing from them; a defect in it, however, is that the leaves are somewhat too naturalistic for the conventionalised curving of the stem lines, though the general effect is so very graceful. Miss Rowe calls attention to the treatment of the spiral stem lines, "which in the hands of the unskilled are apt to look hard and stringy, instead of being graceful lines giving strength and continuity to the design. The most satisfactory treatment is to outline the spiral with a fluter or veiner, using the sides of the tool to cant the edges. The spiral then seems to blend with the background, and has not that detached look which is so often noticeable when the edges are cut down vertically." This is a good point; the effect of a spiral stem seeming to blend with the ground is far more delicate than one which, as far as its section is concerned, might be only cut out and *appliqué*.

In this Second Series we find (in accordance with what has already been observed as to the earlier Renaissance period) the influence of architectural forms still very strong. There is a notable example of this in the fine railing given in Plate XXII., and at present in the furniture gallery at South Kensington; yet, except in the fact of the arches at the top from one baluster to another (always a bad and false form in woodwork), and the small classic capitals from which they spring, there is no direct imitation of stone architectural features; the balusters, charmingly designed and full of graceful detail, look like the general idea of the stone baluster lengthened out into suit-

Fig. 2.—Panel, Musée des Arts Decoratifs, Paris. Late XVIIIth Century.

able proportions for wood, and forming in that respect a very good example of the modification of design to suit the material. On one section of the baluster, nearly half way up, an ornament of masks in low relief is carved, differing in each baluster; a nice point in this bit of detail is that while the balusters are round in section, the masks are not carved so as to look symmetrically outward and inward and to right and left, but *three* masks occupy the circumference, so that they face unevenly to the eye; a pretty point in the design. The designs of the middle of the sixteenth century include a great deal of the kind of ornament called strap-work, which when introduced into England became so prominent a feature in Elizabethan detail. In regard to this class of work we may quote Miss Rowe's remark as to the superior delicacy of the French work:—

"In this simple style of carving the charm of the old over the modern work is, first, that the pattern is in very low relief, generally being under one-eighth of an inch; and from this it may be assumed that the greater the relief the greater the amount of modelling required; second, that where the pattern is not modelled, or only very slightly, the ground spaces are small and the pattern and the margin are generally united. In England these points were not always observed, and consequently the work is often very crude."

We quite concur in the opinion in a general way, though we may point out that in the examples given in the portfolio only one of the strap-work patterns, as far as we observed, is connected with the margin: but it is certainly better so. In regard to the example of a cabinet, Plates XXIII. and XXIV., where one piece of wood is planted on another to make a greater projection of moulding, we are glad to observe that the editor warns the student that, though this may be legitimate in some cases, "for furniture, or anything else that has to stand the wear and tear of daily use, it is a very great mistake." In fact, this is one of the worst forms of the mistake of applying to wooden furniture a system of construction properly belonging to stone architecture.

Whatever may be thought as to the artistic vices of the Louis Quatorze and Louis Quinze periods, it must be admitted that the artists of those days invented a style of detail of their own, often very effective and beautifully executed, and that they shook themselves free from the tyranny of architectural detail and treated their carved woodwork as carved ornament simply, and not as imitated construction. The second plate of the series, Plate XXXVIII., certainly shows us two sets of balusters in which architectural features are misapplied; the column forms used for the upper portion of the baluster are too thin in proportion for their situation, and the treatment of the lower portion, though pretty, is weak and wanting in breadth; these, in short, are poor designs, and might better have been omitted as far as the student is concerned, for he will learn nothing from them. But in the remainder of the plates we are almost entirely rid of imitation architectural detail; and if the ornament is not of the purest in taste, it is impossible to deny its grace and piquancy, and in some cases its great force and vigour, as in the Louis Quatorze candelabrum shown in Plate XLI., which may indeed be said to be tawdry in style, but of which the vigour and *verve* (the French word seems best to define the French character in the work) are undeniable. As an example of the art of this period and of the illustrations of the Third Series of Miss Rowe's Portfolio we give (Fig. 2) a reduced reproduction of the panel shown in the concluding plate (LIV.), now in the Musée des Arts Decoratifs at Paris, and of which the editor truly says that a finer example could not be found of Louis Seize work, as regards design, mouldings, and execution. It is a meretricious style in itself, no doubt, and it contains the mischievous error of uniting conventional and naturalistic foliage in the same design; but with all these faults what a grace and spirit there is about it, and how thoroughly it is wood-carving work, and not anything else. It is the pretty superficial art of a superficial age, and one would not wish to revive it; but it is certainly charming within its limits, and the work of an artist who was doing his best.

THE CHEMICAL EXAMINATION OF MORTAR.

By H. F. Hills, F.C.S.

In 1892 Mr. J. Hughes contributed two papers to *The Builder* upon "The Composition of Ancient Mortars," in which he gave analyses of a number of mortars taken from various churches, castles, and abbeys of the British Isles. One of the papers concludes with the following important statement: "The higher the proportion of amorphous or gelatinous silica soluble in alkali, the better (is) the quality of the mortar, and, as this kind of silica is associated originally with the lime rather than with the sand, it becomes of the greatest importance that the character and composition of the lime intended to be used should be fully inquired into; and the best possible quality in the neighbourhood always selected by the architect and used by the builder." The details relating to the estimation of this "soluble silica" were given in the paper referred to, a 10 per cent. solution of caustic soda being used as the solvent.

Upon applying the process described to some samples of old mortar taken from Bow Church in East London, and adhering strictly to the details enumerated, very satisfactory and concordant results were obtained. The sample of Bow Church mortar taken for analysis was from a joint in the chancel wall, and is believed to have been made when the wall was first erected in A.D. 1480-1490. The joint was in too good a condition to justify penetrating into it to any great depth, but the extreme exterior surface was avoided, as it might be contaminated with soot and residues from the evaporation of rain-water solutions of the surrounding stone (Kentish rag). The mortar was hard, compact, and in excellent condition.

Comparing the analysis of this mortar with Mr. Hughes' analyses, it is found that Corfe Castle possesses the mortar which most nearly approaches it in composition, thus:—

	Bow Church.	Corfe Castle.
Probable date of erection about A.D.	1480-1490.	1000
Water (lost at 212 deg. F.)	4·48	2·42
Water of combination ...	3·30	4·02
Lime	26·55	31·05
Magnesia	·31	·28
Potash	—	·20
Soda...	—	·15
Oxide of iron }	4·00	·95
Alumina }		·15
Sulphuric anhydride ...	4·86	·26
Carbon dioxide	18·47	22·86
Chlorine	—	·65
Gelatinous silica, soluble in alkali	8·37	7·50
Insoluble matters (sand) ...	29·28	29·51
Other matter and loss ...	·38	—
	100·00	100·00

According to Mr. Hughes, the mortar of Corfe Castle is one of the best mortars examined by him, but the above analysis shows that Bow Church mortar is of an equally good quality. It is remarkable that Mr. Hughes did not find as much as 1·5 per cent. of sulphuric anhydride in any of the ancient mortars, whereas Bow Church mortar contained 4·86 per cent. This may have been present in the lime originally used, or partly present in the water used for mixing the mortar, or it may have been absorbed from the atmosphere through the agency of rain water. The sand when separated from the calcareous portion of the mortar appeared to be of good quality, the grains being irregular in size, and for the most part having sharp edges.

It must be remembered that most of the carbon dioxide, the combined water, and possibly of the sulphuric anhydride has been absorbed since the lime and sand were mixed. Deducting these three constituents, and calculating the percentage proportions of the remaining compounds, the analysis appears thus:—

	Bow Church Mortar (on quicklime basis).
Moisture	6·10
Insoluble silicious matter ...	39·91
Silica, soluble in alkali	11·41
Lime	36·19
Magnesia...	0·42
Oxides of iron and alumina ...	5·45
Other matter and loss	·52
	100·00

The insoluble silicious matter was found upon analysis to yield 91·64 per cent. silica and 7·85 per cent. of oxides of iron and alumina.

As the mortar was used between Kentish ragstones, the following remarks from Whichcord's "Observations on Kentish Ragstone" are of interest:—

"The durability of buildings erected with ragstone depends mainly upon the qualities of the lime from which the mortar is made. The durability of ragstone wall work can only be depended upon when executed with mortar made with lime burnt from the ragstone itself; this mortar becomes in the lapse of time so very hard as to form almost one and the same body with the stone."

It is impossible to say whether the lime used in this case was made from the ragstone itself, but if the amount of "soluble silica" present in lime made from Kentish rag were determined, it would afford some indication as to the probability of such being the case.*

The proportions of sand and lime used were probably (roughly) one of sand to one of lime.

The next sample examined was some mortar or grout (believed to be about 150 years old) taken from a position about midway between the internal and external faces

* Since writing the above, a piece of the stone from the same position in the chancel wall has been examined for "soluble silica" in the stone itself, and also in the quicklime obtained by calcining the stone. It was found that conversion into quicklime did not materially affect the soluble silica. The figures obtained were:—

	In stone Per cent.	or	In quicklime from stone. Per cent.
Total silicious matter.....	7.25	....	12·10
Silica soluble in 10 per cent. NaOH	3·65	....	6·09
Insoluble silicious residue	3·60	....	6 01

of the external wall of the north aisle, and about 2½ ft. above the ground level. This wall had a total thickness of about 22 in.

This mortar contained numerous gravel pebbles varying in size from about 1 in. along their longest edge to particles little larger than sand-grains. The pebbles were irregular in shape and water-worn. Upon grinding down the mortar and picking out the pebbles by hand, these latter were found to amount to about 20 per cent. of the total weight of the mortar.

The mortar could easily be broken up and crumbled in the hands. It possessed a peculiar musty odour. When heated, a disagreeable odour of burning organic matter was evolved, and the substance darkened for a moment, owing, no doubt, to the liberation of free carbon. Very rapidly, however, the carbon vanished, leaving a greyish-white residue, which was devoid of odour. Even upon mixing the residue with water it evolved no odour beyond that usually obtained upon mixing lime with water.

The analysis of this mortar is shown in the following columns, the composition being calculated from the original analysis to what it would have been before the lime absorbed carbon dioxide from the atmosphere. Taking the figures of the last column, it will be seen that the mortar consisted of a mixture of gravel and lime in the proportion of about three of gravel to one of quicklime. The percentage of "soluble silica" is, as might be expected, by no means high. The amount of sulphuric anhydride is high, as compared with Mr. Hughes' analyses, but it approximates very closely to the amount found in the old mortar from the chancel wall.

Analysis of Grout or Mortar from Interior of Aisle Wall.

—	Analysis after extracting Pebbles.	On Quicklime Basis deducting CO_2 and Combined Water.	Analysis including Pebbles.	On Quicklime Basis deducting CO_2 and Combined Water.
Moisture (lost at 212°F)	1·58	1·92	1.26	1·47
Water of combination and organic matter	6·03	—	4.82	—
Gravel pebbles	—	—	20·00	23·35
Other insoluble silicious matter	50·85	61·97	40.68	47·50
Silica, soluble in 10 per cent. Na OH	2·00	2·44	1·60	1·87
Lime	18·95	23·09	15·16	17·70
Carbon dioxide	†11·91	—	*9·53	—
Oxides of iron and alumina	2·50	3.05	2·00	2·33
Sulphuric anhydride....	5·29	6·45	4·23	4·94
Magnesia, &c., and loss	·89	1·08	·72	·84
	100·00	100·00	100·00	100·00

† Equivalent to 27·07 per cent. carbonate of lime ($Ca\,CO_3$).
* Equivalent to 21.66 per cent. carbonate of lime ($Ca\,CO_3$).

It was suggested that loam had been used in the mortar, but the following analysis of the insoluble silicious matter (excluding pebbles) shows that it was evidently ordinary gravel and not loam that was employed. Had loam been used the percentage of alumina in the silicious matter would have been higher.

	Insoluble Silicious Matter per cent.		Loam (Abney) per cent.
Silica	93·21	...	66·7
Alumina	2·85	...	27·0
Oxide of iron ...		...	1·3
Carbonate of lime ...	—	...	0·5
Organic matter ...	—	...	5·0
	96·06		100·5

H. F. H.

NOTES.

Bacteria in Crude Sewage. IN February last the London County Council instituted what promises to be a most searching and valuable inquiry into the purification of sewage by filtration. It is being carried out by Dr. Frank Clowes, chemist to the Council, and Dr. A. C. Houston, who is already well known for his work in this department of science. The first report on the subject has recently been issued, and deals with the "Bacteriological examination of London crude sewage." This report contains the result of Dr. Houston's labours during a period of about two months; it will be followed in due course by one or more reports on the bacteriology of the experimental filters and of the filtrates. After describing some of the methods used in the bacteriological examination of sewage, including the search for specific micro-organisms (such as the typhoid and diphtheria bacilli, bacillus coli communis, &c.), Dr. Houston proceeds to estimate the number of bacteria, spores of bacteria, liquefying bacteria, bacilli of various kinds, and other minute organisms, in numerous samples of (1) Barking crude sewage and (2) Crossness crude sewage. The results reveal an amount of life almost inconceivable in its multitude; in one cubic centimetre of the Barking sewage upwards of 7,000,000 bacteria were found, and more than 5,000,000 were found in a sample of Crossness sewage. To find the number in a cubic inch, we must multiply these already-immense numbers by (roughly-speaking) sixteen. The numbers of specific bacilli are, in comparison with these totals, very small, but, when considered positively, they are large enough to show the deadly nature of crude sewage. Photo-micrographic illustrations of the most common bacilli, &c., add considerably to the value of the report. If the rest of the inquiry is conducted as ably as this portion, it will be of great and lasting benefit to men engaged in this most important branch of sanitary science.

Underground Water of the Lea. A FEW weeks ago Sir John Evans pointed out what would be the effect of excessive pumping from the New River Company's wells in the immediate neighbourhood of the Lea, and showed that the channels through which springs naturally rise in the bed of the river might, by excessive pumping from the underground water in the chalk, be converted into passages along which the water of the river would escape and find its way to the wells. His prophecy having to some extent been fulfilled, he has written to the *Times* about it. The immediate object of his calling attention to these matters apparently is to expose "the fallacy of the view that in the chalk of the valley of the Lea there was an unlimited supply of underground water available for use in London." We should accept the general view put forward by Sir John Evans if we thought the surface drainage of the Lea was practically the same as the underground drainage. No doubt springs coming up in the river bed, on being withdrawn, allowed the cracks which they occupied to be filled at once by the water from the river. But that does not do away with the fact that the Lea basin is a large one, and from the underground flow of water there is every reason to believe that much of it would in any case be unaffected by whatever may percolate from the river itself—the main body of the water being too deep-seated and too far off, besides flowing parallel with the general trend of the Lea in some cases, according to the observations of geologists. The underground water-supply resources of the Lea are by no means yet exhausted, though they must not, of course, be drawn upon indefinitely.

Magnetic Action of Electric Railways. THE joint discussion last Tuesday by the Mathematical and Mechanical Science Sections of the British Association on "The Magnetic and Electrolytic Actions of Electric Railways" shows clearly that scientific men are strongly of opinion that the Board of Trade regulations for electric traction are not stringent enough. Whilst every one is anxious that cheap and rapid traction facilities should be provided for the working classes, yet it is important that traction companies should not be allowed to use the earth as part of their return circuit. This would be no great hardship to them, as an insulated return can be made at very little extra expense, and in some cases would lead to more economical working. At present the return currents, as in the case of the City and South London Railway, often upset telegraphic and telephonic work, and probably are corroding gas and water mains more or less rapidly. Again, the interests of a magnetic observatory such as Kew must be protected. The magnetograph records now being taken there are continuous for forty-two years, and they show that only by continuous work for many years to come can we hope to get at the secret of the earth's magnetism. If the records are disturbed by magnetic induction from the long line of trolley wire which it is proposed to erect in its neighbourhood, no money compensation will remedy the evil, as the continuity of the observations will have been broken. The observatories at Washington and Toronto have been rendered useless as magnetic observatories by the induction effects from electric tramways, and the British Association has done well to discuss the remedies for this evil before it was too late.

An Eight-Hours' Day Experiment. THE *Times* of Tuesday contained a communication detailing the experience of a Sunderland shipbuilding firm, Messrs. Short Bros., in regard to the adoption of an eight hours' day at their works. The system has been adopted there since 1891, and the following statement from a partner of the firm is quoted:—

"Messrs. Short took up the system in the belief that they could get the same amount of work out of their employés by a better method than that which then prevailed. Of the men working on time wages 15 or 20 per cent. lost the first quarter of the day while the piecemen scarcely ever started before 8.30 under the old method. The men started at six o'clock, stopped at eight for half an hour for breakfast, had another interval of an hour at noon, and the day's work was finished at five. The conditions under which the old system was carried out were such that many workmen were physically incapable of maintaining the long hours. It was, in point of fact, then quite common for a man with 24s. a week to lose, on an average, three quarters per week, simply because he was unable to rise every morning at 6 o'clock and work full time. Under the system which then obtained in the yard, from 15 to 20 per cent. of the employés never started till after the first quarter had been lost. Under the forty-eight

hours' system, the men start—after breakfast—at 7.30, and go on with only one break until 5 o'clock, and they are able to do more work this way than under the old system, and at the same time more work is got out of the machines, the results of the eight hours' system being an increased output and a decreased cost. Under the fifty-three hours the men did not average anything like eight hours per day—indeed, some of them did not average five hours, owing to the time they lost. The men work better and more hours under the forty-eight hours' system than under the other, while the machinery is also kept running more regularly and for a greater number of hours."

This is the most favourable report of the result of the eight hours' system in a large establishment which we remember to have met with; but it must not be forgotten that the experiences of some other large employers have been entirely against it, and the result evidently depends a good deal on the special circumstances. For employers to introduce it when they find it beneficial to themselves and their workmen is quite a different matter from clamouring for legislation to compel all employers, under all circumstances, to do the same. If it is found by experience that the system of starting later and doing away with the breakfast hour works better for employers and men it will be further adopted, and Messrs. Short's report is, at all events, a valuable contribution to the evidence on the subject.

Walthamstow Public Baths.

WE fear the history of the competition for this building affords a fresh illustration of the unfortunate laxity with which both committees and architects too often regard the question of what a building will really cost. Competition designs were invited for the building on the basis of an estimated cost of 7,000*l.* Mr. Rowland Plumbe, the assessor, selected the design of Mr. Dunford as being "the one which could be carried out at a sum nearest the limit of 7,000*l.*," an expression which shows that from the first it was evident that none of the designs could have been carried out for that sum; and, according to the report in the *Essex Herald*, Mr. Dunford had himself stated that his design could not be carried out for that sum, but his statement "was kept from the Council for months." Ultimately, for reasons which do not appear, the Walthamstow District Council discarded the architect of their first choice (thereby throwing over the assessor's award), and appointed another competing firm, Messrs. Spalding & Cross, whose design they considered much superior. Messrs. Spalding & Cross, on being asked, estimated the cost of their design at from 8,000*l.* to 9,000*l.*, so that they went into the competition ignoring the conditions. On tenders being obtained, however, the lowest was for 14,836*l.*, which it appears has been accepted, amid a good deal of grumbling. It is evident that the Council started with a mistaken idea as to the cost of the kind of building they wanted; but having deliberately advertised for a building not to exceed 7,000*l.*, the conditions should have been maintained; and the proper thing to do, when the assessor found that none of the designs could be executed for the sum proposed, was to pronounce the competition void. Furthermore, when we find an architect stating the probable cost of a building at 9,000*l.*, and the lowest tender coming out at nearly 15,000*l.*, we cannot but observe that any architect ought to be able to estimate the cost of a proposed building from his own plans much nearer than that, and that his clients have very good right to complain if he does not.

Sanitary Condition of Alnwick.

THE sanitary condition of the Urban District of Alnwick, and the housing of the working classes therein, is the subject of a report to the Local Government Board by Dr. G. S. Buchanan. In Alnwick and Canongate a variety of unwholesome conditions were reported in 1849 by Mr. (Sir Robert) Rawlinson to the General Board of Health: unhealthy, damp, and overcrowded dwellings, packed away in narrow courts and alleys behind the main thoroughfares; abundance of privy and midden nuisances; unpaved or badly paved yards; no public water supply and no system of sewerage; but between 1852 and 1854 a large improvement scheme was carried out by the newly appointed Alnwick and Canongate Local Board. But it appears that at the present time a large proportion of the dwellings of the town, principally those occupied by the poorer classes, are to be found huddled on small areas at the back of the main thoroughfares. Almost always it has happened at one or another time in the history of a property that whatever open space originally belonged to it has been utilised for building. As a rule, the only windows and doors are those facing the passage or common yard. These dwellings are thus without through ventilation, and commonly they receive insufficient light. Windows are frequently small, and often can be opened only to a trifling extent. Standing on a wet soil, constructed of porous stone, and unprovided with damp-proof course, these houses are conspicuously damp. To the unhealthiness produced by crowding together of insanitary dwellings upon area are added the evils attending overcrowding of persons. Drainage appears to be fairly good. Excrement disposal is nearly always by water-closets, though these are reported to be hardly sufficient in number for the inhabitants; and the receptacles for house refuse (removed once a week by the Corporation) are unsatisfactory; they are often only old pails, broken boxes, or other makeshifts, and usually they have no cover; in consequence, before the arrival of the scavengers' cart much of the refuse may become blown about the public streets. The water supply, obtained from springs on land, three miles to the south-west of Alnwick is reported to be liable to contamination from drainage of public highways and by farm-house and cottage sewage, though recently considerable improvements have been effected. At each of the springs a chamber has been constructed with a view to excluding surface drainage, and water is carried thence to the mains in iron pipes. Additional springs have been brought within the collecting system. Such water as is not derived from springs, however, is principally contributed, as before, by drainage of agricultural land. This source of supply cannot be considered satisfactory, not only because much of the land furnishing the water is from time to time manured, but also because it is apt to fail altogether in dry seasons.

Old House Burned in Paris.

AN interesting old house in the Rue de Jouy, near the Hôtel de Ville, Paris, has been destroyed by fire. The house was built from the designs of François Mansard, towards the close of the eighteenth century, for the Duc d'Aumont. Lebrun painted in it, as a decoration, his "Apotheosis of Romulus," and the sculptor Auguier adorned the garden with a fine group of "Venus Couchée." Under the First Empire the house had been transformed into the Mairie of the district, and more recently it had become the "Pharmacie Centrale des Hôpitaux." Although the original design had suffered a good deal during the successive transformations of the building for these various purposes, it still retained a good deal of the original sculpture and decorative detail, and was regarded by French archæologists as a building of considerable interest.

An Exhibition of Lithography.

THE revived interest in the art of lithography is to be further illustrated by a special exhibition of lithographs at South Kensington Museum, to open on November 1, under the auspices of the Committee of Council on Education. As lithography was discovered by Senefelder in 1798, this will be a centenary exhibition. The "Department" will be assisted in the selection and arrangement of the exhibits by a committee organised by the Society of Arts. It is to be hoped that the opportunity will be taken to get a representative collection of the lithographs of Raffet and Charlet, and other eminent French lithographic artists of the earlier part of the century. A good collection of Raffet's works would in itself make the exhibition worth holding.

The Cluny Museum, Paris.

THE scheme for keeping the ground clear in front of the Cluny Museum has unfortunately fallen through. The Government and the Municipality were pretty well agreed as to the purchase of the land, but at the last moment the proprietors refused to sell it, and appear to have formed the resolution to build apartment houses on the ground on their own account. It is a pity that this could not have been prevented, as the new block will undoubtedly interfere with the effect both of the Cluny Museum and the New Sorbonne buildings.

MICHELANGELO.*

BY C. J. TAIT.

THE following entry occurs in the notebook of one Lodovico di Lionardo Buonarroti Simoni: "I record that on this day, March 6, 1474, a male child was born to me. I gave him the name of Michelangelo, and he was born on a Monday morning four or five hours before daybreak, and he was born while I was Podesta of Caprese, and he was born at Caprese." We learn further from Vasari that at the moment of his nativity "Mercury and Venus entered with a benign aspect into the house of Jupiter, which indicated that marvellous and extraordinary works, both of natural art and intellect were to be expected of him."

He was second in the family. His elder brother, however, we shall not hear much of. He entered the Priory of San Marco, and was lost to the world. Michelangelo thus became practically the eldest son in so far as responsibility went—responsibilities that toward his father and younger brothers he loyally fulfilled.

Six months after his birth his family removed to Settignano, a suburb of Florence, in the neighbourhood of the stone quarries, from which the city is built, and where his forebears were masons. He was put to school, where he showed himself backward, giving up all his leisure time to drawing, in which pursuit his

* A Paper read by Mr. C. J. Tait, A.R.I.B.A., at the Exeter Technical and University Extension College, June, 1897.

master secretly abetted him. After the usual reluctance exhibited by parents to abandon their children to the seductions of the arts, Michelangelo was apprenticed to Ghirlandajo, the goldsmith and painter who executed the celebrated frescos in the choir of S. Maria Novella. The apprentice soon showed great technical ability "by producing perfect copies of ancient drawings, executing the facsimiles with consummate truth of line, and then dirtying the paper so as to make it pass off as the original of some old master"—another second Chatterton, indeed.

Ghirlandajo was a foremost painter in the Florentine manner, but the precocious boy liked neither the man nor his manner. His sympathies were already engaged. "The boy, now drawing from one thing, now from another," we are told, "without fixed place or steady line of study, happened one day to be taken by Granacci (another pupil) into the garden of the Medici at San Marco, which garden the Magnificent Lorenzo—a man of the first intellectual distinction—had adorned with antique statues and other reliques of the plastic art. When Michelangelo saw these things and felt their beauty, he no longer frequented Domenico's shop, nor did he go elsewhere, but judging the Medician gardens to be the best school, spent all his time and faculties in working there." Lorenzo observed the lad's talent and took him into his household, at the same time providing some small office in the Customs for his father. The humble Lodovico asked only for this obscure post, when Lorenzo answered, with a smile, "Ah, my friend, you will never be rich." Two years after this Lorenzo died, but he had showed the lad much kindness, taking an interest in his work, and calling him up to show him any new gem or intaglio he became possessed of. Michelangelo never forgot this friendship, and it bound him to the Medician interest for his life. It was during this period that, while working in the church of the Carmine, a young braggart sculptor, Torregiano, gave him a blow that, breaking the bridge of his nose, has given us that face that we know and love so well. This Torregiano, who Cellini tells us was more of a bravo than a sculptor, came to England, and did work in Henry VIII.'s Chapel at Westminster. The gentleman in question afterwards came to a violent end in Spain.

The Medici household being broken up by Charles VIII.'s inroad, Michelangelo started off to Bologna. In consequence of a defective passport he was there fined 50*l.*, which an opulent Bolognese, learning that he was a sculptor, paid for him, and took him into his service. He remained more than a year, when a sentiment against alien immigrants drove him back to Florence, which was then under the rule of Savonarola. The year following he went to Rome, as the most likely field for his talents. Circumstances had mixed him up with the Cardinal di San Georgio. While in Florence, a Roman dealer had seen a Cupid of Michel's, which he bought for 30 ducats and sold for 200 ducats to the Cardinal as an antique. The purchaser becoming suspicious of the trick, sought out the most likely sculptor, and being directed to Michelangelo, his doubts were confirmed, and the dealer was made to refund the price. This incident served as some introduction to the capital, for the Cardinal gave him small works to do, but he made a better friend in one Jacopo Gallo, for whom he executed a group of Dionysos, followed by the famous Pietá of the Vatican, which at once raised him to notoriety. The articles binding the sculptor to the performance of this work are still extant, setting forth the time that the work should take, viz., one year, and the amount to be paid him for the same, including the cost of the marble—in all 450 golden ducats of the Papal mint. The group represented the mother of the dead Christ supporting the body of her Son upon her knees. He had before this doubtless executed another group of the Madonna and Child which is now in Bruges. There is no clear evidence as to the date, but he writes from Rome to his father to hide and be careful of a work which was destined for some Flemish patron. This group is more simple in conception than that of the Vatican. The frame of the Madonna is not of so large a mould, nor the head so proportionally small, thereby accentuating this characteristic of build. The group is pleasing, and in contrast to the Pietá, which is painful.

Meanwhile the sculptor's family were giving him some trouble and anxiety. His father had lost his berth in the Customs with the banishment of Piero. His second brother he had set up in the cloth trade, where he did but indifferently well. The next, who was but little good, he put in the same business; and the next to him, again, greatly annoyed Michel by sinking to the level, as he expresses it, of a common peasant upon his father's farm at Settignano. These four often required, and were not backward in asking assistance, which the elder son was always ready to give, although it must often have greatly reduced his slender resources. "Although as I have said," he writes, "I am out of pocket myself, I will do my best to get money. I will send you what you ask for, even should I have to sell myself into slavery."

His own habits of life were parsimonious enough. When at Bologna he slept four in a bed, himself, that is, and his three workmen. Although under such circumstances he must surely have slept less, yet under no conditions did he sleep much. Sleep, he declared, gave him pains in the head and deranged his stomach. Further, having a tendency to cramp, he always slept in his clothes, even to the tall boots which he always wore. One thinks with sympathy of the three workmen. He took but little pleasure in his food, and during the progress of any important work, he kept a piece of bread in his pocket, which he consumed during his labour.

This ascetism of life was neither healthy nor natural. Indeed, a point in the dramatic setting that surrounds the sculptor's life, draws its pathetic note from his morbid disregard for the innocent joys of this world, and the melancholy that fastened upon him. They tell how he walked the streets of Florence "like an executioner." One thinks of him in connexion with Samuel Johnson, who fought bravely against the same curse. Still his health was better than might have been expected, for he was a weakly child.

He is described as having been middling in height, broad in the shoulders, the rest of the body somewhat slender in proportion. "The shape of his face oval, the space above the ears being one sixth higher than a semicircle. Consequently, the temples project beyond the ears and the ears beyond the cheeks, and these beyond the rest, so that the skull in relation to the whole head must be called large. The forehead seen in front is square; the nose a little flattened, not by nature, but because when he was a young boy, Torrigiano, a brutal and insolent fellow, smashed in the cartilage with his fist. Michelangelo was carried home half dead on this occasion, and Torrigiano, having been exiled from Florence for his violence, came to a bad end. The nose, however, being what it is, bears a proper proportion to the forehead and the rest of the face. The lips are thin, but the lower is slightly thicker than the upper, so that seen in profile, it projects a little. The chin is well in harmony with the features I have described. The forehead in the side view almost overhangs the nose, and this looks hardly less than broken, were it not for a trifling protuberance in the middle. The eyebrows are not thick with hair. The eyes may even be called small, of a colour like horne, but speckled and stained with spots of bluish yellow; the ears in good proportion; hair of the head black, as also the beard, except that both are more grizzled by old age; the beard double-forked, about five inches long and not very bushy, as may partly be observed in his portrait." His portrait, painted by himself, hangs among the portraits of great artists in the Uffizi Gallery, in company with, may I add, our own painters, Leighton and Millais.

Michelangelo returned to Florence at the age of twenty-six, with considerable opportunities before him. Notwithstanding the wealth of able sculptors which Florence could once boast, there was now no one of repute to greatly interfere with his chances. Verocchio, Luca della Robbia, Desiderio, were the last of the great names passed, or passing, away. One of his first commissions was the David, which until recently stood in front of the Palazzo Vecchio, and now removed to a museum. The story of this statue is probably well known to you: how the Signory had had a block of marble in their possession for a hundred years or so, that, having been blocked out for the form of a prophet at the Carrara quarries, but blocked out badly, was put aside as spoiled, and impossible to get a figure out of. An opportunity having arisen of getting rid of the stone, Michelangelo was consulted as to its final possibilities, with the result that he promised to shape a statue from it. The result is ingenious, for it is so tight a fit that you can see where he has come to the outside face of the block and had to leave it. It was just one of those problems that delighted him, and tickled the speculative Florentine fancy. A contract was drawn up and a special studio built; and here, for two years, for the sum of 400 golden florins, the sculptor worked. You must understand that the modern method of modelling a full-size figure in clay and pointing it off upon the marble had not been invented, and the artist probably worked from a small wax model. There are, indeed, at South Kensington wax models of the limbs of this figure some six or eight inches in length, most carefully displaying the anatomy, and it was from these that the artist doubtless worked. There was thus no certainty in the effect of his blows upon the chisel, and the extraordinary energy with which he dealt them was not calculated towards precision.

"I am able to affirm," says a witness, "that I have seen Michelangelo at the age of more than sixty years knock off more chips from an extremely hard marble in one quarter of an hour than three young stonecutters could have done in three or four; a thing quite incredible to one who has not seen it. He put such impetuosity and fury into his work that I thought the whole must fly to pieces, hurling to the ground at one blow great fragments 3 in. or 4 in. thick, shaving a line so closely that if he had overpassed it by a hair's breadth he ran the risk of losing all, since one cannot mend a marble afterwards or repair mistakes as one does with figures of clay and stucco." The David cannot be said to be a pleasing figure. The enormous size of the head, hands, and feet in proportion to the rest of the body, can only be excused or rather accounted for by the fact that the sculptor must have set himself to make a realistic representation of a raw youth, growing by pauses and snatches, and not yet fully developed. One feels in this case as one feels before all his work in varying degrees, that he started with an idea, a dominating idea which drove his mallet and chisel at the furious rate with which he is reported to have wielded them, but which seems to have been gradually and insensibly overcome by realistic influence. In this figure the idea would clearly be that of adolescence, a youthful man or a manly youth; a distinction, I may remind you, that a Greek sculptor, with his subtle refinements of expression, boasted to display. But the David—says one critic—is, to state the matter frankly, "a colossal hobbledehoy."

At this time Michelangelo made the two tondi, Madonnas in relief enclosed in circular spaces. One of these we possess, and it hangs in Burlington House. It is very graceful, recalls the Bruges Madonna, and is not finished.

He also began an immense cartoon for a fresco in the Palazzo Vecchio, known as "The Battle of Pisa," while Leonardi da Vinci was employed upon another wall. It was done after the manner of Signorelli, whom Michelangelo always considered as the greatest Italian master, in which estimate we can hardly agree with him. Signorelli was extremely able as a draughtsman and bold as a colourist, but in effect, he was as hard as nails. For the rest of his time in Florence the sculptor seems to have given up his chisel for the composition of sonnets. Despite his extraordinary energy, he had his times of dreaming. He is said to have been by constitution saturnine and sluggish, only energetic when powerfully stimulated. Indeed, he himself would have wished to be handed down to posterity as a poet rather than as a sculptor.

Julius II. ascended the Papal throne in 1503, and with this event begins a connexion, an intimacy between two powerful natures that was to mark a long period in Michelangelo's work-a-day career. Fiery, impatient, ambitious of immense projects, but large-minded withal, Julius was a patron fit to be served. There must have been many passages of arms between man and master, some of which, at least, have been recorded.

Julius was desirous to build himself a mausoleum to do honour to his name, and he sent for Michelangelo to Rome to assist him. Two thousand ducats were given the sculptor, and he was sent off to Carrara to quarry the marble, where he spent eight months among the mountains. The Carraras stand white and bare between Florence and Spezzia, in view of both cities, and the eight months must have been dreary enough. Apartments were given

to Michel near the Vatican, and a bridge was thrown across, that Julius might visit him as often as he had a mind to; and his mind was not always Michelangelo's. The drawing extant of this mighty undertaking which never reached fruition, is a mere rough ink sketch, but Condivi describes it as having four faces, and surrounded by niches filled with statues. The arts of Painting, Sculpture, and Architecture were to be represented with Julius as their patron; upon the cornice were to stand four large figures, of which Moses was one; and somewhere higher up still were two angels bearing a sarcophagus, one of them smiling as if to rejoice that the soul of the Pope had been received among the blessed spirits, the other weeping, as if in sorrow that the world had been robbed of such a man. Within was a chapel where the Pope proposed to place his remains. In all there were more than forty statues, not including histories of the Pontiff's actions in bronze reliefs.

Julius died in 1513, and it does not appear how much of the design had been executed. His successor was delegated to continue the work and the whole design was reconsidered and a new contract made, and yet another later. The only remains of this momentous and futile undertaking are the two captives of the Louvre, still unfinished, and the Horned Moses. It does not seem to have been the sculptor's fault that the work lagged. The projects were repeatedly changed by Julius in his lifetime, who had innumerable irons in the fire upon which he blew hot and cold, and after his death by the legions of busybodies that haunted the idle city. That unmatchable waster of time, a legal process, was dragged in to still further hamper matters in order to recover sums of money which it was alleged were not represented by the work done. There was a fourth and yet a fifth contract, and after many suggestions as to where the monument should be ultimately placed, it found a refuge in San Pietro in Vincoli, in the year 1545. Moses still figures in the design. All the other sculpture is from the hands of other artists. Thus, this quite unimportant work, as it ultimately became, dragged itself through forty years of Michelangelo's life. The pain and vexation that this business caused him may be illustrated by the following letter, referring to a delay in one of the contracts :—

"For the loyalty of thirty-six years, and for my having given myself of my own free will to others, I deserve no better. Painting and sculpture, labour and good faith have been my ruin, and I continually go from bad to worse. Better would it have been for me if I had set myself to making matches in my youth. I should not be in such distress of mind. I will not remain under this burden, nor be vilified every day for a swindler, by those who have robbed me of my life and honour. Only death or the Pope can extricate me. Your lordship tells me that I must begin to paint and have no anxiety. I answer that one paints with the brain and not with the hands, and he who has not his brains at his command produces work that shames him. Therefore, until my business is settled I can do nothing good. The ratification of the last contract does not come. On the strength of the other made before Clement, I am daily stoned as though I had crucified Christ. My whole youth and manhood have been lost, tied down to this tomb."

In order to attend upon Julius, the sculptor had left uncompleted his cartoon of the battle of Pisa for the Signory of Florence, and he seized the opportunity afforded by a disagreement with the Pope to return to it. Speaking of these dissensions, he says "that they all arose from the envy of Bramante and Raffaello da Urbino, and this was the cause of my not finishing the tomb in his lifetime. They wanted to ruin me. Raffaello, indeed, had good reason, for all he had of art he owed to me. Then again, Pope Julius changed his mind about the tomb and would not have it made. Not knowing this, I applied to him for money, and was expelled from the chamber. Enraged at such an insult, I left Rome on the moment." "Tell the Pope," he adds, "that if henceforth he wants me, he must look for me elsewhere." Julius was equally put out by such summary treatment, and despatched five horsemen after our sculptor to bring him back, but to no purpose. Julius applied to the Signory, who at last told their scapegrace that they had no mind to go to war with the Pope because of him. "You must return," they said; "and we will write you letters of such authority that, should he do you harm, he will be doing it to this Signory." So Michel took the letters and returned to his master, after having tried a bout with him, as the Signory added, that the King of France would not have ventured on.

Michelangelo bought his pardon by executing a bronze statue of Julius for San Petronio at Bologna, on the portals of which, you will remember, Della Quercia worked. Bronze casting was not at all in Michelangelo's line, and it would not be surprising to know that the crafty old Pope was aware of the fact, and looked upon the order in the light of a task. He gave the sculptor 1,000 ducats for the job, which amount was entirely swallowed up in the endeavour and the re-casting of the statue, the first attempt having failed. The metal *caked*, an accident that Cellini so graphically describes, when he threw his pewter dishes into the pot to help it to burn. Writing to his brother upon the second attempt, Michel says: "Well, well, there is much to thank God for; it might have been worse." But he adds: "If I had the whole thing to do again, I don't think I could survive it." This statue stood, or sat rather, over the central door of San Petronio exactly three years, when it was thrown down in a tumult, and the remains were cast into cannon.

The next task assigned to the sculptor by his master was the painting of the vault of the Sistine Chapel for the sum of 3,000 ducats. He had had little painting to do since he left the studio of Ghirlandajo. The "Battle of Pisa" had been executed in black and white. After a year at this work he writes to his father: "I am still in great distress of mind because it is now a year since I had a farthing from the Pope, and I do not ask because my work is not going forward in a way that seems to me to deserve it. That comes from its difficulty, and also from its not being my trade." The whole vault of the Sistine is over 10,000 square feet, and cut up by spandrels and lunettes. The painter was ultimately able, by the aid of seven assistants, to cover it with 343 figures, some 12 ft. and some 18 ft. in height. The preliminary sketches and cartoons for this work probably took him a year at least. The date of his commencement is uncertain, but he was in full swing by January, 1509. He did not get on with his assistants. It was a peculiarity with him that he never could get along with those working beneath him. On the one hand, they irritated him, and on the other, his capacity for drudgery without proper food, sleep, or, for the matter of that, washing, interfered with those sentiments of respect with which a servant should regard the master. Then mould broke out over the first portion completed, and, in despair, he begged the Pope to release him from his contract. "It is not my trade," he again told the Pontiff, "and if you do not believe it, come and see." And Julius oftentimes did come and see, climbing up the ladders and being assisted on to the scaffold by the long-suffering craftsman. The first half of the ceiling was uncovered in November, 1509, after the painter had been shut up for two years, and the result was at once enormously popular.

The scheme of the ceiling may be roughly described as sybils and prophets alternating, and occupying the lunettes of the windows, while the Deluge, the Creation and the Fall of Adam and the creation of the sun, moon, and trees of the earth covered the vault between them. The final completion of this work was spread over years. It was suggested—it is hinted too, by jealous enemies of the painter—that other artists should be called in to finish the decoration and so make the chapel, like the Pantheon at Paris, a monument to contemporary talent. Bramante again, whom Michelangelo always regarded as a dangerous man, was credited with the suggestion. Bramante was an important architect whom we shall hear of later in connexion with St. Peter's. But it was left to the great sculptor to complete amid the many labours and anxieties of his life.

His family were a constant tax upon both his energies and his resources. A letter written to his brother Simone will illustrate the situation in which he was constantly placed.

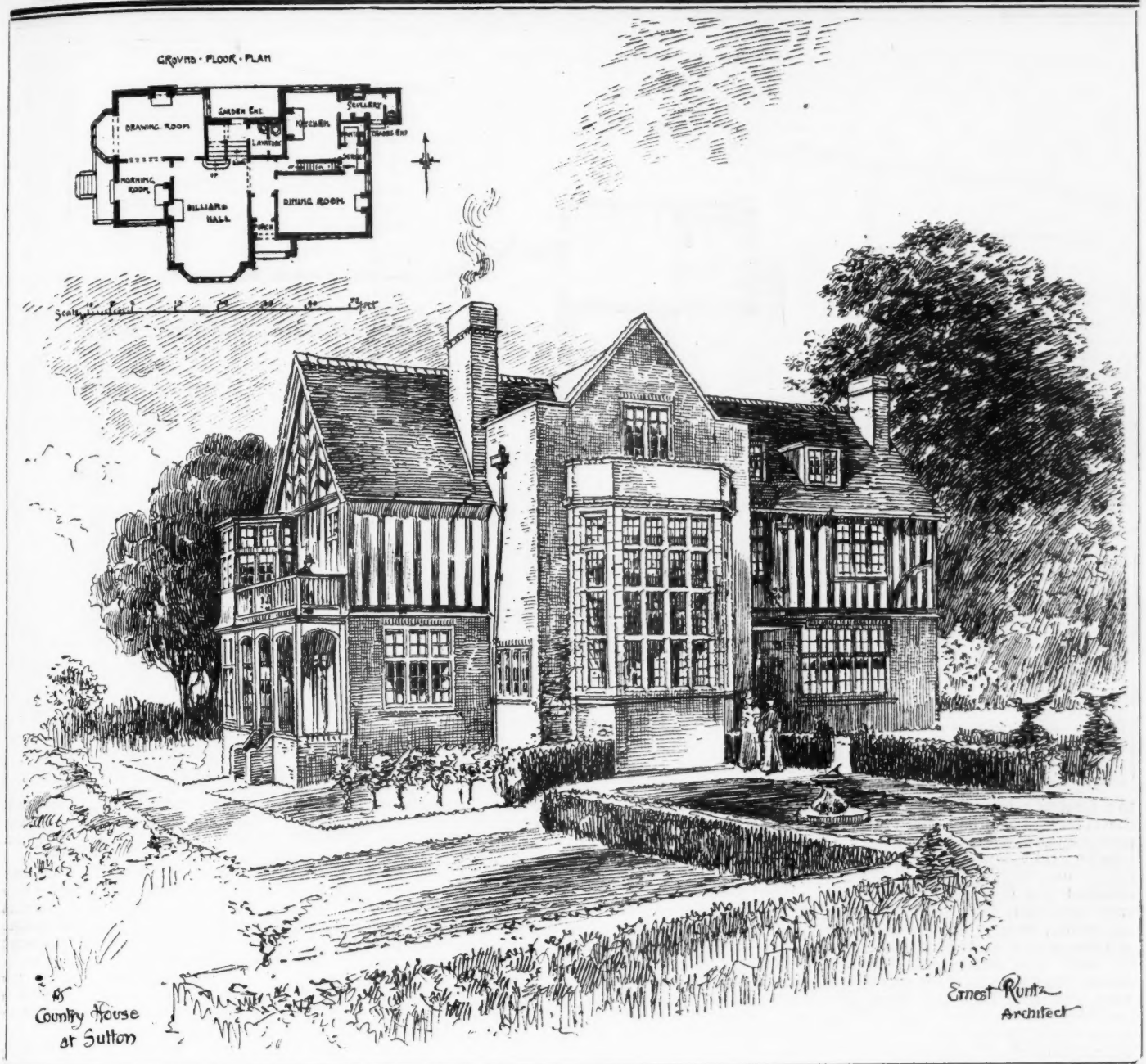
"I have something to say to you which I have said before. If you will endeavour to live rightly and to honour and revere your father, I am willing to help you like the rest, and I will put it shortly within your power to open a good shop. If you act otherwise, I shall come and settle your affairs in such a way that you will recognise what you are better than you ever did, and will know what you have to call your own. No more. What I lack in words I will supply with deeds. I cannot refrain from adding a couple of lines. It is as follows: I have gone these twelve years past drudging about through Italy, borne every shame, suffered every hardship, worn my body out in every toil, put my life to a thousand hazards and all with the same purpose, of helping the fortunes of my family. Now that I have begun to raise it up a little, you, and you alone choose to destroy and bring to ruin in one hour what it has cost me many years and such labour to build up. By Christ's body, this shall not be; for I am the man to put to rout ten thousand of your sort, whenever it be needed. Be wise in time then, and do not try the patience of one who has other things to vex him."*

ARCHÆOLOGICAL SOCIETIES.

EAST RIDING ANTIQUARIAN SOCIETY.—At the annual general meeting of this Society, held on the 7th inst., Mr. St. John Hope gave an address on the interesting subject of Watton Abbey, the foundations of which were disclosed by excavations two or three years ago. Mr. Hope said there were yet many points in the history of the abbey to be cleared up, and before the paper which he had promised the Society could be written and put into a final and readable form, it would be necessary to carry out further excavations. The abbey had belonged to the remarkable Gilbertine Order, which was originated by a rector of Sempringham, in Lincolnshire, who provided this foundation for some ladies of his parish who were desirous of leading a religious life. This monastery, if it might be called so, was literally a place of entire seclusion, and those ladies having retired to it never left it. In order that they might receive the necessities of life certain lay sisters were appointed to wait upon them, and those sisters brought food to the nuns and put it through a small window or hole in the outer wall of the monastery. But Gilbert, the founder, concluded that this was not a desirable state of things, as it made it possible for the lay sisters to hold conversations with the secluded ladies on secular matters, and disturb the current of their thoughts towards higher things. Thus it came that the lay sisters also entered the monastery to perform their duties within, and without they were replaced by a number of lay brothers who attended to the external affairs of the nuns. But that arrangement also raised difficulties. It occurred to Gilbert to get over them by attempting to model his new establishment on the lines of the great Cistercian Order, which was then in a flourishing condition. He applied to that order to take those sisters under their charge, but the abbots of the order refused. Gilbert then drew up a code of rules based on those of the Cistercians. But in the case of the Cistercians a certain number of monks were priests who ministered to the wants of the community, but in the case of the ladies that was a difficulty that had to be got over. Gilbert decided to attach to each of his foundations—for that at Watton was only one of seven—a small college of from seven to thirty canons. Those chaplains were bound by the rule of St. Austin or Augustin, and some have this establishment of Cistercian nuns with Augustinian canons as chaplains. The rule was extremely exacting in laying down restrictions that were framed to keep the two sexes apart. In the church a wall was built between the canons and the nuns so that the one sex could not see the other. The Gilbertine Order did not appear to have made great progress in England. Only twenty-six monasteries of the order existed; half of them were mixed. At the dissolution of monasteries only three existed as double houses, and of these Watton was one. Mr. Hope proceeded to describe in detail the excavations at Watton.—*Yorkshire Post.*

GASWORKS EXTENSION, SELBY.—On the 9th inst. a Local Government Board inquiry was held at Selby, in relation to the application of the Urban District Council for power to borrow 8,400*l.* for gasworks extensions. The Clerk to the Council stated that the present storage capacity of the works was equal to 105,000 cubic feet. At times in 1892 the highest day's consumption was 100,700 ft.; last winter it rose to 180,000 ft. At the present time the Council had practically very little more than half storage for half the maximum day's consumption. In reply to the Inspector, the Gas Manager said that when the new purifier was put in they would be able to purify 425,000 cubic feet of gas per day. The new gas-holder would have a capacity of 196,000 cubic feet, and it would be constructed with a view to two other lifts being added.

* To be continued.



A Country House at Sutton

COUNTRY HOUSE, SUTTON.

IN designing this house the problem for solution was the arrangement of a billiard-room without materially increasing the cost.

This has been overcome by using the entrance hall as a billiard-room, thus obtaining the additional advantage of a good entrance hall not usually to be found in houses of this size. The hall runs up two floors, a gallery at the staircase end serving for an access to the bedrooms. Below the staircase is arranged the garden entrance through which would be obtained a glimpse of the garden from the hall.

The materials are red brick, and stone facings to the large hall window. Portions of the upper parts and walls are finished with rough timbering and plaster, the timber being treated with Stockholm tar. The roof is to be finished with brindled tiles.

ERNEST RUNTZ.

COMPETITIONS.

EXHIBITION BUILDING FOR GLASGOW.—The designs for the Glasgow International Exhibition of 1901 have been considered by a sub-committee, with the result that premiums have been awarded as follows :—The first premium (250*l.*) to Mr. James Miller, 223, West George-street, Glasgow, for design signed "Winter Palace"; the second premium (150*l.*) to Mr. A. N. Paterson, 136, Wellington-street, Glasgow, for design signed "Aiblins"; and the third premium (100*l.*) to Mr. John A. Campbell, 44, West George-street, Glasgow, for design signed "Fin de Siècle" (rather a misnomer for a design for an exhibition in 1901). It is understood that the appointment of Mr. James Miller as architect for the buildings has been formally confirmed. The competition was limited, we believe, to Glasgow architects; very properly, considering the amount of architectural talent which Glasgow possesses.

ARCHITECTURAL SOCIETIES.

DEVON AND EXETER ARCHITECTURAL SOCIETY.—Some of the members of this Society made an excursion to Launceston on the 10th inst., when the ruins of the Priory were inspected under the guidance of Mr. Otho B. Peter, by whose direction excavations were made in 1893, when the foundations of the old buildings were uncovered, which included, when complete, a church about 260 ft. in length. The Priory was of the Austin Canons, founded in 1170 by Bishop Robert Warelwast. A fine Norman doorway now forms an entrance to the White Hart Hotel. The parish church of St. Mary Magdalen, built in 1524-40, was visited. Constructed of granite, it is characteristic of the period when artistic construction had given place to surface decoration, its outer walls being almost covered with carved panels. It is a great contrast to the exceeding plainness of many of the country churches. The old castle was also visited.

NAVAL COLLEGE, DARTMOUTH.—We understand that preparations for the erection of the new Naval College at Dartmouth, in place of the cadets' training ship *Britannia*, will commence almost immediately. The plans by Mr. Aston Webb have been approved by the Admiralty. They provide for the accommodation of 260 of the young officers as well as the permanent staff of instructors. The college will be three stories high, and will comprise a central block, with clock tower and wings stretching right and left. There will be a raised terrace in front. One of the old ships will be retained in the river for the accommodation of the sailors attached to the college. The erection of the building is expected to occupy four years.

Illustrations.

PROPOSED CHURCH OF ENGLISH MARTYRS, YORK.

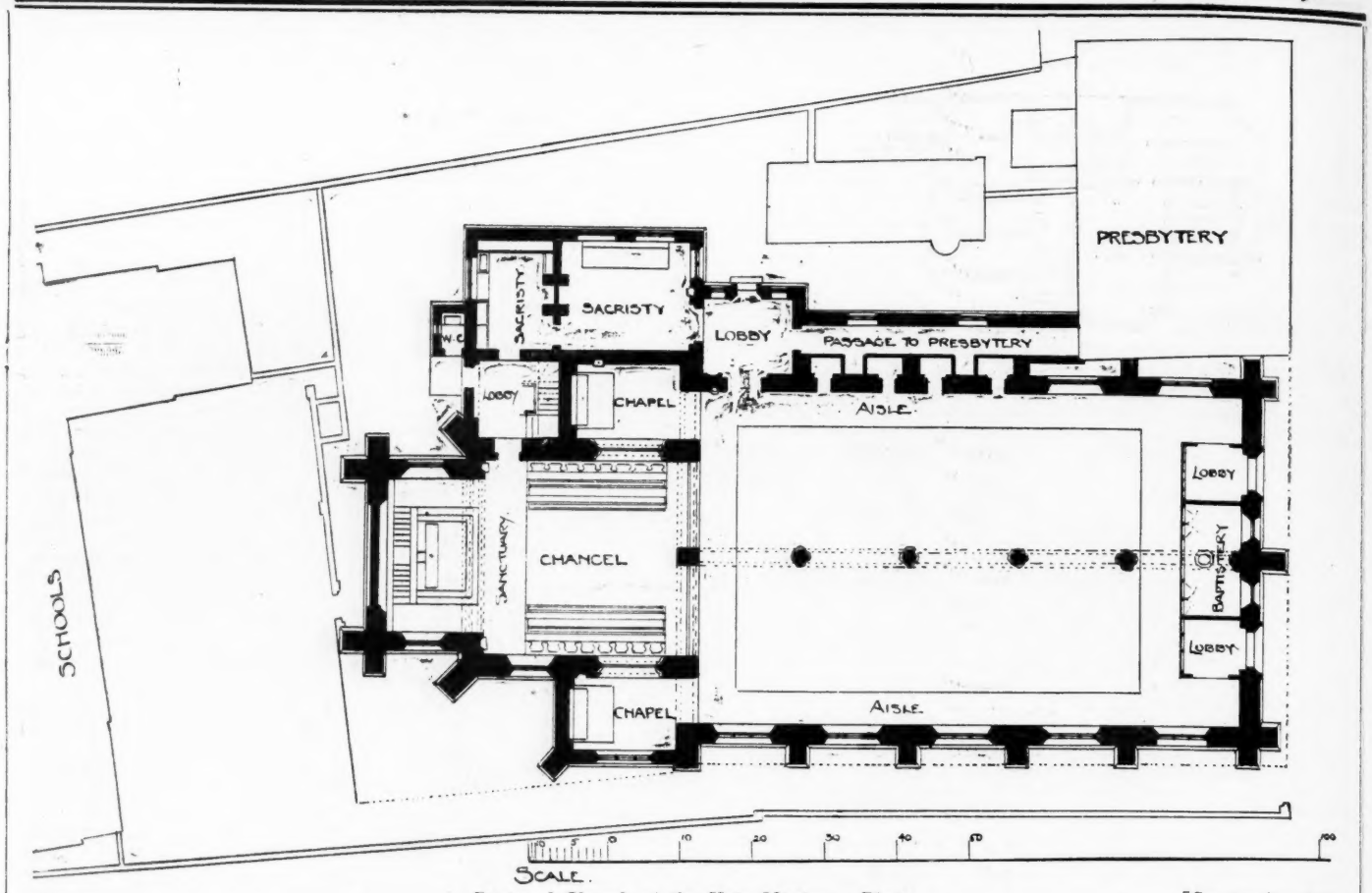
THIS should have been entitled on the plate "Proposed church," but it was only after the lithograph had been printed that we learned from the architect that the scheme had been, in fact, abandoned after the design had been made.

The design was made originally under the firm of Goldie, Child, & Goldie, but was really the design of Mr. E. Goldie, the present representative of the old firm.

The plan, as will be seen, is of some interest from the treatment of the nave as two aisles with a central arcade. In the exterior the position of the octagon turret is happy, and it contrasts picturesquely with the wide low tower. The duplicate arrangement of the nave is effectively shown on the west elevation.

HAMBURG TOWN HALL.

THE new Town Hall at Hamburg, which has just been taken into use, has been long under consideration—in fact, practically ever since the destruction of the old Town hall in the great Hamburg fire of 1842. Numerous proposals were already made at the time as to a suitable site and the general arrangements, Sir Gilbert Scott, among others, being consulted, as well as the Superintending Architect to the Senate, Mr. William Lindlay. Gottfried Semper also made suggestions at that time. After the matter had then been shelved for a number of years, an International Competition was opened in 1856, and, of the forty-four architects who competed, Sir Gilbert Scott received the first premium. The idea of giving the commission



Proposed Church of the Holy Martyrs. Plan. [See previous page.

to a foreigner, however, seemed distasteful to the Hamburg Senate, and, after various postponements, another competition was again tried in 1876, when Messrs. Mylius & Bruntschli (who, we believe, are Swiss architects) obtained the first prize. Again the award was apparently distasteful to the Hamburg authorities, though they seem to have been at a loss as to the selection of a local architect, for there was certainly no one at the time among the members of the profession at Hamburg who stood head and shoulders over his *confrères*. After various further attempts it was hence finally decided to place the commission in the hands of a Committee of local architects, who were, if I may say so, to prepare a collective design. The members of this committee were Messrs. Grotjan, Haller, Hanssen, Hauers, Lamprecht, Meerwein, Robertson, Stammann, and Zinnow, of whom, however, Messrs. Robertson and Lamprecht died before the foundation stone was laid. Herr Haller acted as Chairman of the Committee, whilst the General Manager and Secretary appointed under their auspices was Herr Geissler.

For a building designed by a committee after a protracted preliminary history as described above, and, considering all the petty rivalry and the interference of busybodies, the new town hall is certainly not as unsatisfactory as might have been expected, though it is essentially commonplace both in general design and in detail. No doubt Hamburg can pride itself on the building, which is entirely the work of local men, for, apart from the design, its execution was placed entirely in the hands of Hamburg firms, and every possible effort was made to prevent anything going to outsiders. It is interesting to observe, however, that whilst in 1885 the estimate showed the figure of 230,000*l*., the small bill of extras has run the accounts up to nearly half a million sterling. Taking the design as such and also the lack of perfection in its execution, we, however, scarcely think that Hamburg has had its money's worth, unless the embodiment of local effort as shown in the Hamburg Town Hall is valued by the authorities at some special figure.

The plan of the building was given in our issue of January 5, 1895, in connexion with a general view of the exterior. It does not show any feature of special interest, excepting, perhaps, in the negative sense that some of the corridors are very dark for a structure of this description. The principal rooms are on the first-floor level, and comprise a grand central hall, a Council chamber for the Common Council, a Council-room for the Senate, and further numerous ante-rooms and parlours. The offices are mainly on the ground floor and on the second floor, whilst much of the basement is taken up by the *Rathskeller*, or "tavern," which is so characteristic of the German Town Hall, and which in this instance is by far the best part of the interior of the building.

The Town Hall will always, no doubt, be considered an important structure, owing to its associations and its massive proportions, but as far as architecture is concerned, we are afraid something much better was expected when a city of such importance as Hamburg expended half a million sterling on a new home for its Hanse and Municipal Government.

PALACE GATE HOUSE, KENSINGTON GORE.

THIS house has just been finished after undergoing very extensive and substantial remodelling. As it now stands the frontage on Palace Gate is entirely of Portland stone. The dining-room is panelled in English oak, with an oak ceiling and stone mantelpiece. The hall and staircase are also in English oak, the ceilings being in carved plaster, as well as the soffits of the staircase. The study and the morning-room are examples of careful treatment in painted wood. The drawing room, on the first floor, the interior of which is shown in the lithograph, is panelled and decorated in pear wood, the walls between the panelling being hung with silk, while above is a carved plaster frieze, the ceiling also being of the same material.

Mr. C. J. Harold Cooper is the architect. The front elevation of the house was exhibited at the Royal Academy this year.

BRIDGE OVER THE KELTNEY BURN.

A SMALL road bridge, composed of steel arches supported by masonry abutments, has recently been constructed over the Keltney Burn near Aberfeldy, one of the most picturesque spots in the Highlands of Scotland. The general appearance of the bridge is shown in the accompanying view; the constructional details are given in the lithograph.

The structure consists of four arched ribs, 60 ft. span, and 9 ft. rise at the crown. These ribs are each composed of a web plate, 15 in. by $\frac{3}{8}$ in., and four angles 4 in. by 3 in. by $\frac{1}{2}$ in., and are designed to carry safely all ordinary road traffic.

The floor is composed of $\frac{5}{16}$ in. curved steel plates, carried by cross girders placed 5 ft. apart. These floor plates are jointed along the centre line of the bridge, and are well stiffened by longitudinal angle and tee bars. The curved portion of the plates is filled with concrete, upon which is placed 6 in. of metalling to form the roadway.

The cross girders are composed of four 3 in. by 3 in. by $\frac{3}{8}$ in. angles bars, and a web 7 in. by $\frac{1}{4}$ in. A lattice parapet, having a steel handrail, is fixed along both sides of the bridge. The abutments have been built of rough-cast rubble masonry, this class of work being found very suitable in the Highland districts, the rough-cast face forming a valuable protection against the driving rains so frequently experienced in this part of Scotland.

The architects for the bridge were Messrs. Dunn & Watson, and the works were carried out by Sir William Arrol & Co., of Glasgow, the details of the steelwork, given in the lithograph, having been designed by Mr. J. E. Tuit, of that firm.

This has been an attempt to treat a steel girder bridge in a simple and, as far as possible, in a picturesque manner, and the result is certainly more pleasing in this sense than is sometimes with bridges of this class. Mr. Tuit suggests that one reason why there is a general idea that steel bridges are or must be unpicturesque is that the public are more familiar with the appearance and the details of stone and timber construction than with those of steel, and hence regard the latter as ugly and artificial in comparison; in other words, that when steel structure and details become more popularised, there will be the same sentiment in regard to them as there now is in regard to the older methods of construction. This is a view of the matter which is worth attention, at all events; though it must be remembered that there is an essential difference between a natural material like stone, which has the colour of nature, and is merely shaped for its purpose, and an artificially prepared material like steel, which, moreover, must necessarily be painted. As compared with timber, also, the thin proportions of steel structure are unsatisfactory to the eye in combination with nature. It is possible, however, that habit may alter our feeling in this respect to some extent, and that at the close of the twentieth century the steel bridges of the present day (or some of them) will find place in sketch-books as picturesque features in the landscape.

ROMAN VILLA, DARENTH.—It is stated that the remains of this villa will shortly be covered up again, and corn grown over the site. Those who wish to see it before its disappearance should therefore lose no time.

Bridge over Keltney Burn, near Aberfeldy. [*See previous page.*

THE BRITISH ASSOCIATION.

THE meeting of the British Association at Bristol has been successful in many ways, the attendance being especially gratifying. Nobody expects any very startling communications to be made to the various sections nowadays, for investigators will not wait as they used to do for this annual gathering, but publish the results of their work at the earliest possible moment. Indeed, the general tendency is to write "preliminary papers" which usually savour of hastiness, the sole object in most cases being to forestall some rival in the same line of research. This very reprehensible practice has burdened scientific literature to such an extent that it considerably retards the progress of practical work in nearly all branches. Scientific research has now largely resolved itself into bibliographic research, plus a little work on original lines. Not so long ago it was possible, in making investigations into any particular subject, to begin work at once, and when anything of importance was discovered, to publish it at convenience, with the assurance that the "discovery" was original. Now the investigator, after working at a problem for a year or two, perhaps, will be told, on his results being published, that he has been forestalled by the publications of some unknown professor in a small university in an obscure German or Austrian town. The scientist is of little use, therefore, unless he is master of at least three languages besides his own.

All this extra work has its effect on the calibre of the performances of the average modern scientific investigator, and this is plainly reflected in the general trend of the papers read before the British Association. There is a general lack of solidity in them; they are too frequently a mere *résumé* of the work of others, or a hashed-up edition of the author's own. Year after year we observe the influx of papers from dilettante scientists which are discussed very thoroughly because, from the elementary character of the communications, everybody is able to join in. Chemistry and physics seem to be making more real progress at the meetings than any other branches of science.

The inaugural address of the President, Sir W. Crookes, which was delivered at the People's Palace, Bristol, on Wednesday, the 7th inst., briefly referred to in our last issue, was of a very rambling description, and contained but little of interest to our readers. He alluded to the low temperature researches of Professor Dewar, and especially to the circumstance that the latter had succeeded in liquefying both hydrogen and helium. Static hydrogen boils at a temperature of 238 deg. C. at ordinary pressure, and 250 deg. C. in a vacuum, thus enabling us to get within 23 deg. C. of absolute zero. The density of liquid hydrogen is only one-fourteenth that of water, yet in spite of such a low density it collects well, drops easily, and has a well-defined meniscus. With proper isolation it will be as easy to manipulate liquid hydrogen as liquid air. Thus is a new method of investigation opened to the chemist and physicist. In regard to new gases discovered during the past year, the President gave an appreciation of the work of Professor Ramsay and Dr. Travers, who have announced three new elements — krypton, neon, and metargon. Whether these gases, chiefly known by their spectra, are true unalterable elements, or whether they are compounded of other known or unknown bodies, has yet to be proved. The progress made with wireless telegraphy during the last year was duly recorded; and, of course, the Röntgen rays were noticed. In regard to the latter there are few advances to record. The most successful is the adoption of Professor Silvanus Thompson's suggestion of using for the anti-cathode a metal of high atomic weight. Osmium and iridium have been used with advantage, and osmium anti-cathode tubes are now a regular article of manufacture. The President stated that as long ago as June 1896, X-ray tubes with metallic uranium anti-cathodes were made in his own laboratory, and were found to work better than those with platinum. Thorium anti-cathodes have also been tried. Röntgen has drawn fresh attention to a fact very early observed by English experimenters—that of the non-homogeneity of the rays and the dependence of their penetrating power on the degree of vacuum; rays generated in high vacua have more penetrative power than when the vacuum is less high. The latest statement as to the action of Röntgen rays on bacteria is to the effect that they are killed by the discharge from "hard" tubes. Whether the observation will lead to results of pathologic importance remains to be seen. It now appears that some bodies, even without special stimulation, are capable of giving out rays closely allied, if not in some cases identical, with those of Professor Röntgen. Uranium and thorium compounds are of this character, and it would almost seem from the important researches of Dr. Russell that this ray-emitting power may be a general property of matter. No other source for Röntgen rays but the Crookes' tube has yet been discovered, but rays of kindred sorts are recognised. Quite recently M. and Mme. Curie have announced a discovery which, if confirmed, cannot fail to assist the investigation of this obscure branch of physics. They have brought to notice a new constituent of the uranium mineral pitchblende which in a four hundred-fold degree possesses uranium's mysterious power of emitting a form of energy capable of impressing a photographic plate and of discharging electricity by rendering air a conductor. It also appears that the radiant activity of the new body, to which the discoverers have given the name of "polonium," needs neither the excitation of light nor the

stimulus of electricity. The President then placed before the meeting the results of his own researches in late years, dealing principally with chemical and spectroscopic work, concluding with an apology for psychic research, "subconscious workings of the mind," and other matters of like nature into which we need not penetrate.

On Thursday, the 8th, the sectional work of the meeting began, and presidential addresses were delivered in all sections except that of Anthropology. In the Mathematical and Physical Science Section Professor Ayrton devoted his address principally to a discussion of the phenomena of the atmospheric propagation and dissemination of smells. At the commencement he observed that it seems as if electric traction is destined in time to annihilate magnetic observatories near towns, and even to interfere with telegraph and telephone systems—the system of electric traction has already destroyed the two most important magnetic observatories in the United States and British North America. Passing to that branch of physics dealing with the phenomena of the sense of smell, he noticed that it is a generally accepted idea that metals have smells peculiar to themselves, since, if a piece of metal be taken at random, a smell can generally be detected. But he finds that this is due to their dirtiness, and that, as they are carefully cleaned, they emit no smell. Abrasion by friction, however, does serve to produce a metallic smell; before a metal can evolve a smell, chemical action must, apparently, take place. Although smell may not, like sound, be propagated by vibration, it seems probable that particles of the metal with which we have become accustomed to associate the particular smell, may no more come into contact with the olfactory nerves than a sounding musical instrument strikes against the drum of the ear. He believes that the metallic particles may act on the moisture of the air and liberate hydrogen containing impurities, and that it is the latter which produce the smell, and not the particles of the metal. A phase of the subject of more immediate interest to us is that relating to the diffusion of smell. Professor Ayrton shows that when the space through which a smell passes is screened from draughts, it diffuses with surprising slowness. Its actual diffusion, therefore, is largely controlled by the motion of the air. The power of a smell to cling to a substance seems to depend neither on the intensity of the smell, nor on the ease with which it travels through a closed space. The absorption of scents by glass led him to try whether an actual transpiration through glass could be detected with the nose. For this object a number of extremely thin glass bulbs were blown from soda and from lead glass, so thin that they exhibited colours like a soap bubble, and after odorous substances had been introduced into them they were hermetically sealed and placed separately in glass-stoppered bottles. In some cases, on removing the stopper from a bottle after many hours, a faint odour could be detected, but careful search seems to indicate that minute flaws existed in the glass. There can be no doubt that Professor Ayrton has called attention to a branch of physics hitherto unexplored, and which is destined in its practical applications to be of great service to several branches of sanitary science. Hitherto the phenomena of smells have been approached almost exclusively from medical, anatomical, and chemical standpoints. The investigation has, however, only just been commenced; what has been done is of the slenderest description and of the most elementary character.

In the section devoted to Chemistry, the President, Professor Japp, dealt especially with stereochemistry and vitalism. In the course of his remarks he observed that, of the numerous discoveries made by Pasteur, none appeals more strongly to chemists than his work in establishing the connexion between optical activity and molecular asymmetry in organic compounds—the capital achievement of organic chemistry. Physiologists, as well as the majority of people, were, on the other hand, naturally more attracted by Pasteur's subsequent work, in which the biological element predominates. And yet his earlier work ought to be of interest to physiologists, not merely because it is the root from which the later work springs, but because it furnishes a reply to the most fundamental question that physiology can propose to itself—namely, whether the phenomena of life are wholly explicable in terms of chemistry and physics; in other words, whether they are reducible to problems of the kinetics of atoms, or whether, on the contrary, there are certain residual phenomena inexplicable by such means, pointing to the existence of a directive force which enters upon the scene with life itself, and which, whilst in no way violating the laws of the kinetics of atoms, determines the course of their operation within the living organism. The President then went more fully into the subject of optical activity of organic compounds, and the relation between optical activity and life.

In the section of Geology, presided over by Mr. W. H. Hudleston, the address dealt mainly with the geology of the south-west of England, east of Dartmoor; also on some problems connected with the coalfields in the south of England. That part of the address on the Bristol area was very largely a *résumé* of some well-known work done many years ago; but in the section dealing with "Coal in the South of England" there are some interesting observations and suggestions. Mr. Hudleston remarked that coal would probably be found east of the proved Somersetshire coalfield. The question of the existence of coal south of the Mendips he avoided as being too speculative; we do not see why, however. That portion of the field to the south of Radstock is merely cut off and reversed on itself by the upheaval of older rocks in the Mendips. There is every reason to suppose that before that upheaval took place the coal-seams were continuous, and were simply interrupted locally along the line of the Mendips. We fail to see why this should be more speculative than the question of finding coal to the eastward of Bath, and regret that Mr. Hudleston did not deal with the problem. He regards the vale of Pewsey in Wiltshire as a probable locality for coal. The failure of the coal-borings in the Eastern Counties was next touched upon, but the theme is worn out, being practically denuded of anything original.

In the Mechanical Science section the President, Sir J. Wolfe Barry, touched upon the growth of British shipping, and the recent and future demands for dock accommodation at Bristol and throughout the kingdom; and finally dealt with the necessity for experimental research as the basis of engineering science. He observed that the conditions of commerce now necessitated larger quays and warehouses, better railway approaches, improved sidings, better machinery, as well as deeper water and better approaches to it. Liverpool last year undertook to spend nearly five millions on such works, and we know of very many important projects at other places. Taking the expenditure within the past decade, and adding to it the authorised expenditure at Liverpool, at the great ports on the Bristol Channel, on the Thames, at Southampton, Hull, Middlesbrough, Hartlepool, Sunderland, the Tyne and its neighbourhood, at Grangemouth, the Fife ports, at Glasgow, the Ayrshire ports, the Cumberland and Lancashire ports, and so round the British coasts to Preston, he roughly estimates the expenditure, either made during the past ten years, or contemplated, of some thirty-five millions. Passing to the question of the provision against wind pressure in structures, Sir J. Barry spoke of the danger of hasty generalisation. A great deal of money had been wasted in unnecessary provision against wind strains of 56 lb. per square foot on large areas, in consequence of hurried generalisation from insufficient data. He knew something of what the provision for that pressure cost at the Tower Bridge, but did not wish to mention it; but if the public had been told that the dictum of experts, arrived at however hastily in 1880, was to be set aside in the construction of that bridge, all confidence would have been destroyed in it beforehand, and no Committee of Parliament would have passed the Act. Dealing with the question of establishing a public physical laboratory the President stated that there is now more hope for experimental science and some endowment of research in this country than at any former time. Last year a deputation waited upon the Premier, and Government, whilst somewhat limiting the scope of inquiry, appointed a small Committee to examine and report on the subject. The Committee, after taking much evidence, visiting a similar and highly successful institution on the Continent, and exhaustively studying the question, were convinced of the great public benefits which may be expected from such an institution, and have unanimously reported in favour of its establishment. In the columns of this journal we have frequently urged the formation of such a laboratory, and we shall be glad to find that the work in it is not altogether confined to the elucidation of problems of theoretical interest only, but will be extended to such subjects as testing materials of construction, and the like.

On Friday, in the Mathematical and Physical Science section, Professor O. Lodge described a magnifying or bellowing telephone, consisting of a small light coil capable of moving in a strong magnetic field, and attached to the disc of a microphone transmitter. When the telephonic current is sent through the coil the latter moves, setting in motion the disc of the microphone. A current is thus made and broken in the microphone, which can be sent through the coil of a second apparatus similar to the first. By means of three or four such instruments a very minute sound can be greatly magnified. The author stated that he had not succeeded in obtaining a sound louder than the human voice. Mr. W. H. Preece observed that the Post Office had succeeded at Newcastle in producing a "howling telephone" by using the secondary current from an induction coil, the primary of which was in circuit with an alternating hand dynamo. Lord Kelvin read a communication from Dr. A. Galt on the "Heat of Combination of Metals in the Formation of Alloys." The alloys investigated were brasses with various percentages of copper and zinc, and the object of the experiments was to determine the heat of solution in acid of brass, and of its copper and zinc separately, and to deduce from the results the heat of formation of brass. In the discussion on this paper Lord Kelvin referred to the work of Professor Roberts-Austen on the rise of temperature of molten metals when solid metals are dropped into them. Professor H. L. Callendar described an instrument for measuring electric pressure or current by means of the increase of resistance of a fine platinum wire due to the heating effect of the current passing through it. It is most suitable for use as a voltmeter. Professor T. Preston gave an account of his experiments on radiation from a source of light in a magnetic field, in which the results obtained by Zeeman are photographed, using a large grating spectroscope for the purpose. On the same day the International Conference on Terrestrial Magnetism and Atmospheric Electricity was held under the presidency of Professor Rücker.

In the Chemistry section Professor Sydney Young read a paper on "Some Researches on the Thermal Properties of Gases and Liquids," in which the author details the results of his work for some years past in establishing the thermal properties of an extensive series of compounds. Professor P. F. Frankland made a communication on "The Action of Bacteria on Photographic Plates," in which he stated that ordinary bacterial cultures in gelatine and agar-agar are capable of affecting the photographic film even at a distance of half-an-inch, whilst when they are placed in contact with the film, definite pictures of the bacterial growths can be obtained. This action does not take place through glass.

On Saturday but little was done, as several excursions had been arranged; but in the Physics section the department of Meteorology was presented the report of the Committee on Ben Nevis Observatory. Hourly eye observations by day and night were recorded throughout 1897. The tabulated results included mean atmospheric pressure and temperature and the extreme pressures and temperatures; rainfall, sunshine, and velocity of wind. Professor John Milne presented the report of the Committee of Seismological Investigation, which contains a record of progress made towards the establishment of earthquake-observing stations round the world, some notes on particular earthquakes, also a discussion of some characteristics of earthquake motion, and the relation of earthquake phenomena to magnetic and sub-oceanic disturbances.

In the section of Mechanical Science Mr. T. Forster Brown read a paper on "Some Mechanical and Economic Features of the Coal Question." The question has been well thrashed out on previous occasions, and little fresh is added to our knowledge by the communication. The author believes that we shall have exhausted eleven-fifteenths of our best resources of coal about the year 1950, and shall then have arrived at a stage when our whole annual output will be

composed of a rapidly increasing proportion of deep, thin, or inferior coal. After that there will be coal remaining which could be worked at a gradually increasing cost, sufficient for the supply of the nation for a period of 250 years at an average output of 250,000,000 tons per year. Such calculations, we may add, are of very little value, for they always assume that we know exactly the extent of all our coal-fields, and cannot possibly take into account with any degree of accuracy the quantity of coal available in comparatively unexplored areas of the country in all probability coal-bearing. Neither can the annual consumption of coal be predicted for so long a period.

On Monday the Geographical Section was most extensively patronised to hear the adventures of M. de Rougemont. The Mathematical Section was principally occupied with astronomical matters and with the conference on Terrestrial Magnetism. The Geologists were regaled by a paper by Mr. R. Etheridge on the "Relation and Extension of the Franco-Belgian Coalfield to those of Kent and Somerset." Most of the information is old, but Mr. Etheridge places on record the results of coal-borings at Pluckley, west of Brabourne and Penshurst, the latter being twenty-five miles west of Dover and some 1,700 ft. deep. The Brabourne trial has passed through 1,875 ft. of sedimentary rocks, ranging from the Gault to the Lower Lias inclusive, but the bore-hole has passed into the red conglomerate of, perhaps, Old Red Sandstone; in all probability the depth would be increased. We may point out that although older beds than the Coal Measures have been met with in this boring, the former may be thrust over the coal, or reversed—phenomena common enough in the extension of the Dover coal-field on the other side of the Channel. Professor Boyd Dawkins observed that he was at present undertaking five or six borings in the south-east of England, and he proposed to go on boring until he found out the direction of the dip, and then he hoped to verify the existence of coal to the north and east of Dover.

On Tuesday there was a flagging of interest in practically all sections. The mathematicians and physicists and the members of the Mechanical Science Section met jointly to discuss "The Magnetic and Electrolytic Actions of Electric Railways." Professor Rücker gave an account of disturbances of a magnetic instrument produced by the City and South London Electric Railway at distances of ½ mile, 2¾ miles, and 3½ miles respectively. In every case the disturbance was such as to render any records of the motion of the magnet absolutely valueless. Again, at Greenwich, the vertical force and earth-current records have been rendered useless from similar causes. Other speakers followed on in the same strain. The Committee on Electric Standards reported that the work of testing the resistance coils of the Association, and of comparing other coils with the Association's standards, had been continued. The standards are to be removed to Liverpool from Cambridge.

The Chemistry section was very busy, there being no fewer than fifteen papers in the day's list. A communication of special interest to us was made by Dr. S. Rideal on "Standards of Purity for Sewage Effluents." He pointed out that the majority of these standards are arbitrary and artificial. But a calculation of the proportion of nitrogen in its oxidised forms which are harmless, and its unoxidised forms which are odorous and sometimes deleterious, would denote the extent to which the sample has been purified. We may mention that the principle involved in this is by no means new; for many years something like it has been employed in estimating the quality of water for drinking purposes.

The section of Mechanical Science considered a paper by Mr. E. D. Marten, Engineer to the Severn Commissioners, on some "Schemes for the Improvement of the Waterway between the Bristol Channel and the Birmingham District"; whilst Mr. W. Walker read a paper on "Hydraulic Power Transmission by Compressed Air." The apparatus employed for the latter purpose is Taylor's hydraulic air compressor. In this the air is compressed by becoming entangled as bubbles in a falling stream of water, the head due to which affects the compression. It was stated that the advantage of obtaining power in this manner, as compared with utilising the available head in a turbine, was not apparent unless the power had to be conveyed some distance. The apparatus is especially valuable in new countries where there are rapids or waterfalls.

On Wednesday the meetings were brought to a close, though most of the sections had finished their work on the previous day. In the Physical Section, amongst other papers, was one by Mr. S. R. Milner and Professor A. P. Chattock, on "The Thermal Conductivity of Water"; the result of forty determinations gave 0·001435 C.G.S. units as the conductivity of water at 20 deg. centigrade.

PREMISES, 166, BUCHANAN-STREET, GLASGOW.

THIS building has a frontage of 45 ft. to Buchanan-street and side elevation of 130 ft. to Dundas-lane. It is to contain shops and offices, is of fireproof construction, and is served by a hoist. The proprietors are the British Workman's and General Assurance Company, Limited. There are seven stories and attics to

Buchanan-street, and six stories and attics to Dundas-lane. JOHN A. CAMPBELL.

BOOKS RECEIVED.

THE CATHEDRAL CHURCH OF WELLS. By the Rev. Percy Dearmer. (Geo. Bell & Sons)

INSPECTION OF THE MATERIALS AND WORKMANSHIP OF CONSTRUCTION. By Austin T. Byrne. (John Wiley & Sons, and Chapman & Hall.)

The Student's Column.

SOUND, LIGHT, AND HEAT.—XII.

SOUND-PROOF WALLS *(continued)*.

WE have seen that the velocity of sound in solid bodies is, in a measure, an index of their value as sound-proof materials. In the last article we showed that this property could be materially modified and better results obtained by taking advantage of certain methods of construction.

In such woods as walnut, fir, and ash the velocity is very high, ranging from 15,744 ft. per second in the first-mentioned, down to 15,314 ft. per second in ash. It is evident, from what has been already said, that none of these woods are suitable for wainscotting on thin partition walls, though when used in small pieces they might possibly be tolerated, especially when cut across the grain. Elm and cedar are a little better, the velocities in them not being so high; but the two best of the commoner kinds of wood are oak and pine, the velocity of sound in the latter being only 10,900 ft. per second, as already mentioned in another connexion.

Although we have, so far, only dealt with wood for sound-proof purposes, we are, of course, perfectly well aware of various other substances that have been proposed. Let us now consider some of these. Ignoring tallow, wax, and paraffin, which can only be regarded as materials for temporary expediency, though very efficacious for the time being, the velocities in them going down as low as 1,180 ft. per second, we may pass on to consider certain metals. Lead stands in the front with a propagating velocity of 4,653 ft. per second. This metal may be laid on in sheets, and there must be no "leaks." True lead must be obtained as far as possible, for the different kinds of compo. are not as good for the purpose. Pewter is not bad, but has more vibration in it than lead, and the sound is not as readily "absorbed." We do not suppose that gold-plate lining will ever come into general use, but the precious metal has not double the propagating velocity of lead, and is an excellent sound-proof material.

The same may be said of silver, which yields results only a little inferior to gold. The value given for copper is 12,194 ft. per second, but that must only be taken in a very general way, for in the act of rolling copper sheeting a fibre is almost always imparted to the metal which (as we have seen in reference to wood) is undesirable. Copper sheets electrolitically deposited would be much better, especially if used in small pieces and put together as in covering the lower part of the hulls of yachts, and the like. Its value as a sound-proof material is about the same as that of oak and in certain situations may be preferred as it can be used in thinner sheets and economises space. Wrought iron and steel are not suitable for the purposes mentioned; the velocity of sound in them reaching as high as 16,498 ft. per second. Glass is almost as bad, though we may have something to say concerning its use for purposes of reflection of sound.

For many reasons wood will be preferred by most people for wainscotting, though, as we see, certain metals are better as being more sound-proof. A judicious construction where money is practically no object, would be a combination of metal and wood. If the student will turn to the diagrams in our last article (p. 234 *ante*) he will perceive the position of the "cut-offs" near the ceiling and floor (fig. 1, *b*, *c*, fig. 2, *b*, *c*, and fig. 3, *b*, *c*). As lead has a much lower velocity than any kind of wood that metal could be employed with advantage throughout in the positions *b* and *c*. It is hardly necessary, however, to point out to the architect some manifest disadvantages attaching to the employment of lead in the positions indicated—its tendency to "buckle up," great weight, and the difficulty of repair when the wall has to be perforated in wiring for electric bells, electric light, and what not. Still, for colleges of music, where instruments are being played in adjacent rooms, and absolute quiet is required, the mode of combining soft metals with wood after the manner indicated might be taken into consideration.

Turning to another class of substances—stucco, plaster, cement, &c.—it may be remarked that these have found much favour in late years, and many kinds are efficacious enough when used in sufficiently large quantity. In the majority of cases, however, the partition walls have to be extra thick to permit them to be employed to the best advantage. Of course, any wall may be made sound-proof if made thick enough; the point is, especially with partition walls, to combine lightness and economy with sound-proof conditions—that is what we are aiming at.

Where walls for several reasons have to be constructed hollow, the difficulties of making them sound-proof are greatly increased. The real reason why in many buildings, such as those erected for cheap flats, or the eligible suburban terrace, the partition walls between rooms let so much sound through is because, owing to scamped work, the walls are often hollow. In such work it is a common thing to find the laths merely nailed to wooden uprights and plastered outside, leaving more or less space between the uprights. This method, which is the jerry-builders' own, leads to one of the greatest nuisances the occupants of "eligible suburban residences" have to endure. It is in cases such as this in respect of which the law courts hear most of the properties of the non-sound-proof wall. We know of no way of "curing" such a wall except to pull it down and rebuild it properly.

Even in better built houses but little care seems to be bestowed on ceilings and the floors above them. There can be no question that the requirements of the plumber and gas-fitter have had their influence in this. When the "gas leaks" it is so easy to pull up the boards and inspect the pipes? The acoustic properties of the floor and ceiling below count for nothing in comparison with this facility; so to accommodate the gas-fitter the floor and ceiling are so constructed as to act as two sounding boards, leaving a resonant air-space between. It is hopeless to expect to get a quiet room with such methods of construction, and people beneath will always hear when any one is walking on the floor above—the floor could not be better constructed for the purpose.

We are not aware of any experiments carried out to ascertain the velocity of sound in brickwork. That must, however, very largely depend on the class of bricks used and the mortar or cement employed. The general result cannot be very high, for we know from Mallet's experiments that schists, even with their accompanying contortion and general direction of schistosity yield only just over 1,000 ft. in a second. Again, solid granite gives us only 1,664 ft. per second. We imagine, however, that the result with ordinary brickwork must be higher than this. The writer is of opinion that the time has come when more experiments in regard to the propagation of sound in building stone should be carried out. When Mallet derived the results mentioned, the means of ascertaining them were not as accurate as they now are. And unless we are very much mistaken the "solid granite" referred to was not granite as used in building, but as it occurs in the field. It is true that he also ascertained the velocity in "discontinuous granite"—whatever that may mean—and found it to be some 350 ft. per second less than in the solid granite. By "discontinuous granite" we presume that granite veins penetrating some metamorphic rock are implied, as Mallet usually carried out his masterly observations on a large scale, and not from the architect's but from the seismologist's standpoint, we believe.

The "solid granite" will, no doubt, have been permeated by numerous open joints; if not, the results are inexplicable. We refuse to believe that sound is not more rapidly propagated in granite walls than it is in tallow, and that wax is not a better sound-proof material than solid granite. Exhaustive and new experiments on granite, sandstone, and limestone walls are badly wanted. Any results on granite will be seriously impaired unless it is explicitly ascertained whether the rock is foliated or not. Again, a coarsely porphyritic granite we should expect to yield widely different results to a close-grained one. The great crystals of felspar in the former must act detrimentally to the propagation of sound in the stone. To be told that paraffin gives almost three times the velocity of "solid granite" is certainly beyond belief.

With brick walls, it is clear that the more solid and homogeneous bricks will allow sound to pass more readily than stock bricks, sand-bricks or rubbers. We have no figures to quote, but that must be the case following on the known laws of the propagation of sound in divers substances. No doubt the straight edges in bricks are responsible for conducting some of the sound, but unless the mortar is exceedingly hard they cannot have a preponderating influence. It so happens that in most well-built walls where very hard bricks are used hard cement is required to hold them together, so that the wall may almost be regarded as a solid throughout. As the student knows, however, the cement or mortar must to some extent act as a "cut-off." In general terms we should say that terra-cotta bricks yield the highest velocity, hard Staffordshire blues rather less; then come brindles, after which ordinary wire-cut reds, red pressed, stocks, and gaults would be found, the best for arresting the passage of sound being sand-bricks and rubbers.

GENERAL BUILDING NEWS.

CHAPEL, BURY ST. EDMUNDS.—The foundation stone of St. Saviour's Chapel, Thingoe Union House, Bury St. Edmund's, was laid last week. The chapel will be built of red brick, with slated roof, and will accommodate about 120 persons. The architect is Mr. Atkinson, of Cambridge, and the builder, Mr. H. G. Frost, of Bury St. Edmund's.

YOUNG MEN'S INSTITUTE, MOTHERWELL.—It is proposed to erect a young men's institute at Motherwell. On the ground floor there will be shop, office, reception-room, and social parlour, and on the first floor a hall to seat 275 persons, with retiring-rooms, recreation and reading rooms. At the rear will be the gymnasium (60 ft. by 30 ft.), baths, cloak-room, &c. The architect is Mr. Alexander Cullen, whose plans were selected in competition.

ST. MARY MAGDALENE, BERMONDSEY. — This church re-opens on the 18th, after repairs, the formation of a new vestry, and entire redecoration. The work has been carried out by Messrs. H. G. Bartlett & Co., Brixton, under the superintendence of Mr. Edward Crosse, architect.

VICTORIA HALL, BOURTON-ON-THE-WATER.—This hall, in course of erection, is being built of local stone; the outside measurement is 54 ft. by 28½ ft., with a staircase wing, on the side remote from the river, of 13 ft. by 20 ft. On the ground floor accommodation is arranged for a billiard-room, reading-room, and committee-room, with lavatories. On the top floor the whole space is devoted to an assembly-room; it is 54 ft. long by 24 ft. wide, and will seat about 200 people. A permanent platform will be erected with a staircase communicating with the committee-room below. The height of the building from the ground-level to the top of the vane is 52 ft. The building is estimated to cost 1,100*l*. The contractors are Messrs. Clifford & Son, of Bourton; the architects being Messrs. Prothero & Phillpot, of Cheltenham.

ADDITIONS TO CHAPEL, FORDER, SALTASH.—Foundation stones of the new schools and additions to Forder Wesleyan Chapel, Saltash, Cornwall, were laid on the 8th inst. The chapel is to be enlarged, re-seated, and renovated, and Sunday schools will be attached. Mr. Edgar M. Leest, of Saltash and Devonport, is the architect, and Messrs. Taylor & Mutten, of Saltash, the contractors for the work, which is estimated to cost 1,312*l*.

BLIND INSTITUTION, PLYMOUTH.—The additions recently made to this institution were opened on the 6th inst. They consist of a new wing containing, with other accommodation, a schoolroom 38 ft. by 22 ft., fitted with special desks for the purposes of instruction of the blind. Adjoining it are a matron's room, a cloak-room, lavatory, and other offices, while in the yard to the rear are play-sheds. The floor above has one room 38 ft. by 22 ft., which is expected to accommodate twenty females as a dormitory. Bath-rooms and the usual offices adjoin. The wing is faced on the exterior with Plymouth limestone and Ham Hill stone dressings, and is connected with the older building by an iron bridge, of special service in case of fire. Mr. H. J. Snell, of Plymouth, was the architect.

GRAMMAR SCHOOL, PAISLEY.—This school, which was recently opened, contains eighteen class-rooms, of which two are specially fitted for science lectures. There are also music-rooms, a cookery department, rooms for clay modelling, drawing from casts, and for painting, a physical and chemical laboratory, and a large central hall for physical exercises and drill. Within the grounds is a workshop for manual instruction. The school is erected of red sandstone, and has accommodation for 950 pupils in the ordinary class-rooms. Mr. T. G. Abercrombie, of Paisley, is the architect.

FREE LIBRARY, WICK, N.B.—On the 5th inst. the new library buildings erected in Wick were

opened by Professor Mason. Their estimated cost is over 4,000*l.* Messrs. Leadbetter & Fairley, of Edinburgh, were the architects.

MISSION HALL, FALKIRK.—On the 10th inst. the memorial stone of the new hall erected for the Town Mission was laid. The hall is situated in Dundee-court, and was erected from plans prepared by Mr. Alexander Gauld, architect, Falkirk, at a cost of 1,650*l.*

INFANTS' SCHOOL, YARM.—On the 12th inst. a new infants' school was opened at Yarm. The architect was Mr. Fletcher, of Stockton.

LIBRARY BUILDINGS, GLOUCESTER.—It is proposed to erect public library buildings in Brunswick-road, Gloucester, as an addition to existing technical school buildings. The library will comprise a hall, lending library, reference library, librarian's room, and news room. It is proposed to appropriate the large room formerly used as a museum, but latterly as a technical drawing room for the reference library, and to utilise a small section of it at the west end, together with the waste space beneath the principal stairs to the art school for a librarian's private room. To erect on the south of the reference library a lending library with entrance hall. The lending library to be two stories in height with a large glass dome light over, the upper story having galleries round, and an open centre, and with wall space for a large number of stock and extra books. The galleries to be reached by a staircase direct from the lending library—a book-lift being also provided. Adjoining the lending library, and occupying the whole length of the land on the south side will be the reading and news room, and in the basement accommodation will be provided for extra papers, and stores, cloak-room, lavatories, &c. To compensate for the loss to the school of art of the technical drawing room taken by this scheme for the reference library, additional accommodation for the school of art is to be provided above the free library, viz.:—A lecture-room and technical drawing room over the reading and news rooms, two class-rooms over the new hall, the space over the reference-library to be rearranged to suit the new conditions, but affording as at present a class-room, art master's room, with lavatory and cloak-room. The buildings are estimated to cost about 5,000*l.* The architects are Messrs. Waller & Son, of Gloucester.

NEW CHURCH, WESTWOOD, NOTTS.—The foundation stone of a new church at Westwood was laid recently. The architect is Mr. P. H. Currey, of Derby, and the contractor Mr. W. Salt, Ripley.

COTTAGE HOSPITAL, SKIPTON.—Memorial stones in connexion with the Cottage Hospital, which is being erected at the west end of Skipton in commemoration of the Queen's Diamond Jubilee were laid on Saturday last week. The hospital is being erected from the designs of Mr. E. C. H. Maidman, of Edinburgh, whose plans were successful in competition.

MEMORIAL HALL, BELFAST.—The foundation stones of the George Thomson Memorial Hall, which is being erected at Belfast, were laid on the 10th inst. The building is being erected at the rear of the Broadway Presbyterian Church, and will be arranged so as to have direct access to it and to adjacent streets. Provision is made on the ground floor for a minor hall, with committee, vestry, and cloak rooms attached. A parlour is also provided; the main hall is 64 ft. by 32 ft. Underneath the sills of the windows in the front gable a deep panel of stone will bear the inscription, "Thomson Memorial Hall." A date stone occupies the centre space above. The contractor for the work is Mr. Thomas M'Millan, and the architects are Messrs. Young & Mackenzie, of Donegal-square East, Belfast.

CONSERVATIVE CLUB, FARSLEY.—The corner-stones of a new Constitutional Club at Farsley were laid on the 10th inst. On the ground floor there will be an entrance hall, a reading-room, an assembly hall, &c. A large billiard room for three or four tables, a smoke-room, the secretary's office, and lavatories will be on the first floor. In the basement there are to be two bath-rooms, a large store cellar, a heating cellar, and a kitchen. The architect is Mr. G. C. Gamble, of Bradford, and the contractors are: Mason, Mr. G. A. Walker, Farsley; joiner, Mr. John H. Robinson, Farsley; slater, Mr. Frederick Thompson, Stanningley; plumber, Mr. Edward Pearson, Farsley; plasterer, Mr. Wilfrid Busfield, Farsley; painter, Mr. H. Grimshaw, Farsley; and ironfounders, Messrs. Whitehead Brothers, Farsley.

CLUB BUILDINGS, LAURENCEKIRK, N.B.—New premises are to be erected at Laurencekirk, for the South Kincardine Club. In the designs two shops are provided on the ground floor. The Club premises, comprising billiard-room, reading-room, and library, with lavatory accommodation, are placed on the first floor. The upper floor is utilised for the Club-keeper's apartments. Hard pressed bricks are to employed. The contractors are:—Bricklayer, Mr. William Anderson, Dundee; joiner, Mr. Alexander Dunbar, Laurencekirk; plumber, Mr. Robert Mitchell, Laurencekirk; plasterers, Messrs. Burness & Son, Montrose; and slaters, Messrs. J. Scott & Son, Montrose and Brechin. Mr. D. Galloway, of Brechin, is the architect.

HOTEL, MONIFIETH, N.B.—A hotel is about to be erected on the Links, at Monifieth. It will be built on the south side of a new street to be formed in front of the Panmure Golf Club-house, and will consist of two stories. On the ground floor will be a large dining-room, drawing-room, tea-room or parlour, public bar, private bar, and a hall 45 ft. by 32 ft., as well as ante-rooms and kitchen. The second floor will consist of a parlour, billiard and card rooms, eight bedrooms, three servants' rooms, and lavatory accommodation. The architects are Messrs. Johnston & Baxter, Dundee.

NURSES' HOME, GARTLOCH, N.B.—The foundation stone of the proposed Nurses' Home at Gartloch was laid on the 8th inst. The Home will accommodate about sixty, and is to be of three stories, built of red stone and similar to the main asylum buildings. It is quite detached from the asylum, and situated at a rather lower level. On each floor will be sitting-rooms, bedrooms, and bath-rooms, while in addition on the ground floor will be matron's-rooms, visitors' rooms, and kitchen. A sick-room for invalided nurses will be found on the first floor. To ensure quiet for the night nurses, their quarters, reached by a separate staircase, have been placed in the top flat. The bedrooms will be of two sizes, and every nurse and servant will have a separate room. On each floor will be a small kitchen. The entrance to the home is placed so as to be equally convenient for asylum and hospital, and opening from it on one side is a parcel and inquiry room. The parlours, which have large windows, are placed at the corners, and the lavatories and bath-rooms are in the wings. The architects are Messrs. Thomson & Sandilands, and the contractors—masons, Messrs. Paterson & Baldie; joiners, Messrs. Hutchison & Grant; slaters, Messrs. A. M. Ross & Sons; plasterer, Mr. Mackenzie; plumber, Mr. J. L. Arnot; painters, Messrs. M'Culloch. The total cost, including furnishings, it is estimated, will be about 20,000*l.*

WORKHOUSE EXTENSIONS, PONTEFRACT.—The vagrant wards, a new lunacy block, and a new laundry department added to the Pontefract Workhouse are now rapidly approaching completion. Altogether the additions will cost something like 10,000*l.* The new vagrant block contains twenty-seven bed-cells, connected with which are apartments for stone-breaking, and a large shed. Stone-breaking is carried on to a considerable extent in Pontefract Workhouse, owing to the fact that the Corporation takes the material for road-mending. There are also spacious association wards, in which the casuals who remain more than one night in the house may spend their time when their task is done; and the block is fitted with lavatories, baths, disinfector, &c., as well as heated by hot water. The new wards for casual females are pretty much on the same plan, all being roomy, light, and airy. In the newly-erected block there are eight cells. The alterations include a new committee-room for the guardians, for which the old tramp ward has been called into service; an extensive laundry; new porter's lodge; and new offices for the Master, the latter commanding a view of the entrance-gate and the task sheds. The architect of the new premises is Mr. J. H. Greaves; the building contract is being carried out by Messrs. Jackson Bros., Goole; and Mr. C. W. King is the clerk of works.

TRINITY CONGREGATIONAL CHURCH, HESSLE, YORKS.—Plans have been prepared for a new church by Mr. Percy T. Runton, of Hull, which have been accepted by the Congregational church committee. The estimated cost of the new church is 3,750*l.*, add to this the cost of the land, and the total required outlay will be about 4,200*l.*

SANITARY AND ENGINEERING NEWS.

NEW DISTRICT WATERWORKS, NEAR ABERDEEN—New waterworks for Waterton District—including the villages of Dyce, Bucksburn, Bankhead, and Stoneywood—near Aberdeen, were opened on the 10th inst. They have been constructed according to plans by Mr. J. D. Watson, County Engineer, Aberdeen. There are 5,000 inhabitants in the district, and the source of supply is a spring at Parkhill, which will yield 200,000 gallons a day in the driest season. The water passes from the intake through a 7-in cast-iron pipe to a point on the Goval Burn, near Parkhill railway station, whence it is pumped by a pair of horizontal double-acting pumps, driven by two vortex turbine wheels up to a high level cistern about 200 ft. higher than the pumping station, and nearly two miles distant. The cistern is near Dyce quarries, and from this point the water gravitates to the Standing Stones reservoir in a 6-in. cast-iron pipe about a mile in length, for the supply of Bucksburn, Bankhead, and Stoneywood. Dyce water supply is carried from the cistern to Dyce reservoir in a 3-in pipe. In connexion with the turbines there is a weir on Goval Burn, and for emergencies a dam has been constructed capable of containing seven million gallons of water, equal to more than three days' supply for the pumps. The contractor for the water and sewage works, which together have cost 10,000*l.*, has been Mr. Peter Tawse, Aberdeen, while the pump and turbines have been supplied by Messrs. Carrick & Ritchie, Edinburgh.

RECONSTRUCTION OF ABERDEEN GRAVING DOCK.—The Aberdeen Harbour Commissioners have now resolved to reconstruct the dock on its present site; that it be lengthened to 615 ft. by moving the site of the entrance eastwards to the extent of 75 ft.; that it should be widened and deepened as proposed by the consulting engineer, Mr. H. Wake; that a sliding caisson be adopted for the entrance in place of gates; that the floor of the dock be constructed on a level plane throughout, instead of having a rise of 3 ft.; and that a pontoon dock be provided on the south side of Albert Basin. The total cost is estimated at 132,462*l.*

WATER SUPPLY, WISHAW, N.B.—The water supply to the town of Wishaw having been found inadequate, the burgh engineer has been busy during the past year in reporting on supplies from a number of sources to the Town Commissioners. The *Glasgow Evening Times* remarks that the scheme which has met with most favour, and which the Commissioners decided to adopt, was to take a supply from the Potrail, Potrenick, and Peden streams, which rise on the Lowthers on the boundaries of Dumfriesshire. Parliamentary powers were applied for, and, these being obtained, the engineer was instructed to report as to the cost of constructing the reservoir. In his report, which was submitted to a special meeting of Commissioners held on Monday, the 9th inst., the engineer estimated that the cost of carrying out the works, including land, wayleaves, and surface damages, would be as follows:—Reservoir, with 18-in. pipes, 93,000*l.*; reservoir, with 16-in. pipes, 81,000*l.*; reservoir, with 15-in. pipes, 78,000*l.*; and reservoir with 12-in. pipes, 67,000*l.* Mr. W. R. Copeland, C.E., Glasgow, certified that he had examined the estimates on which the report was based, and considered the amount sufficient. After discussion, it was arranged to proceed with the work at once, and it was unanimously agreed to adopt the 18-in. pipe. This will give a supply of 2,200,000 gallons per day. The works thus authorised are the construction of three weirs—one on the Potrenick Burn, one on the Potrail Water, and one on the Peden Burn—and the laying of three lines of pipes. From the weir on Potrenick Burn a line of pipes is to be led through Crawford, &c., to the existing reservoir of the Commissioners. A branch line of pipes will then be led from the weir on the Potrail Water, and will connect with the main line at a point 20 yds. further west. A short line of pipes will also connect the weir on the Peden Burn with the main line. The Commissioners are also to construct a compensation reservoir to satisfy the claims of millowners and others interested in the water flowing from the streams. The cost of this is included in the above estimate.

WATER SUPPLY, LIVERPOOL.—In view of the scarcity of water in the East End of London, the following particulars showing how Liverpool is being served, in spite of the drought, will be interesting. The report of the Water Engineer as to the distribution of water for the weeks ending the 27th ult. and 3rd inst., and for the corresponding weeks of 1897, within the limits of the compulsory supply (City of Liverpool and out-townships), was as follows:—

Week Ending	From Rivington and Vyrnwy. Gallons.	From Wells. Gallons.	Total Gallons.
August 27, 1898	142,764,000	36,536,000	179,300,000
Corsp'dg week, 1897	142,654,000	26,740,000	169,394,000
September 3, 1898	137,485,000	39,477,000	176,962,000
Corsp'dg. week, 1897	140,483,000	22,961,000	163,444,000

Rates per head per day on estimated population:—

August 27, 1898 .....31·63 gallons.
Corresponding week, 1897 ...30·25 „
September 3, 1898 .....31·22 „
Corresponding week, 1897 ...29·18 „

Supply to Chorley and places outside of the compulsory limits:—

Week ending	From Rivington. Gallons.	From Vyrnwy. Gallons.	Total Gallons.
August 27, 1898	10,853,000	665,000	11,518,000
Corresponding week, 1897	10,229,000	514,000	10,743,000
September 3, 1898	11,090,000	654,000	11,744,000
Corresponding week, 1897	10,139,000	510,000	10,649,000

Total quantity supplied, both within and outside of the compulsory limits:—

Week ending	For the week. Gallons.	Average per day. Gallons.
August 27, 1898	190,818,000	27,259,000
Corresponding week, 1897	180,137,000	25,734,000
September 3, 1898	188,706,000	26,958,000
Corresponding week, 1897	174,093,000	24,870,000

STAINED GLASS AND DECORATION.

WINDOW, ST. JOHN'S CHURCH, BROOKLANDS, MANCHESTER.—A new stained glass window has recently been placed in this church. The design is from cartoons drawn by the late Sir E. Burne-Jones, and the window has been completed by Messrs. W. Morris & Co., of Merton Abbey. The design is symbolical of the Ascension. The central light depicts two angels with outstretched wings, above the heads of which is a represention of the risen Saviour. This light is supported on either side by two others introducing figures bearing scrolls with a Latin inscription. Over these panels are circular lights showing the heavenly choir of seraphim, and at the apex of the circular panel is a representation of Christ receiving the faithful into Paradise.

Along the base of the window is a dedicatory inscription.

MEMORIAL WINDOW, GREAT BRIDGE.—A memorial window was recently unveiled in Great Bridge Wesleyan Church. It represents the Good Samaritan, and was executed by Mr. Evans, of Smethwick.

FOREIGN.

FRANCE.—A committee has been formed to erect a monument to Chopin in the Parc Monceau at Paris. M. Georges Dubois is the sculptor, and it is intended that the monument should be erected next year. It will consist of an architectural erection against which leans a female figure representing "Music," and supporting a bronze bust of the composer.——Two painters, MM. Olivier Merson and François Flameng, have been commissioned to make the designs for the new French bank-notes. ——A tramway line is shortly to be established from Fontainebleau to Barbizon, across the forest, which it is to be feared will not be improved by this innovation.——It appears that an American Committee has been constituted for the purpose of offering to the French nation a monument in honour of Lafayette, to be inaugurated in 1900. It is to be entirely the work of American artists. It may be mentioned that a Committee of American ladies have also undertaken to provide a statue of Washington to be set up in the neighbourhood of the Place des Etats-Unis at Paris.—— The Municipality of Pontoise have opened a competition for the designs for a new savings bank.—— The fortifications at Bayonne are to be, for the greater portion at least, demolished.——A rope traction lift or railway is to be made from Lourdes to the summit of the Pic du Grand Jer.——Some excavations undertaken at the ancient monastery of St. Maur de Glanfeuil (Maine-et-Loire) have led to the discovery of the bases of columns of a building of the twelfth century, some pavings of the thirteenth century adorned with fleurs-de-lys, as well as some remnants of a Roman villa.——The jury in the competition for a cattle market at Tours has selected the plans of M. Octave Roy, of Tours.——A statue of the painter Millet is to be inaugurated at Gréville on the 29th.——We hear with regret of the death of the only son of the late M. Charles Garnier, who had been in bad health for some years, and died a month after his father. ——M. Pierron, "Architecte voyer en chef" to the Municipality of Paris, has died at the age of ninety. As "Ingenieur des Arts et Manufactures" he had collaborated in all the large public works of Paris for some years, as well as in the steel structures for the 1889 exhibition. He directed also the operations connected with the formation of the Rue Reaumur.

AUSTRALIAN PATENTS.—A patent granted in New South Wales only protects the holder or holders within the boundaries of the colony. The period for which letters patent remain in force varies from seven to fourteen years, generally the latter period; but a certificate of provisional protection can, however, only be granted for twelve months from the date of issue. The number of New South Wales letters patent and certificates of provisional protection issued during the last ten years was 7,679; of which 913 were granted in 1897. The fees for complete letters patent are 5*l.*, and for provisional certificates 2*l.*; should the latter be converted into patents within twelve months of issue, the amount is allowed, only 3*l.* additional having to be paid.

MISCELLANEOUS.

FONT, ST. MARY'S CHAPEL, ABERDEEN.—A baptismal font has just been erected in St. Mary's Chapel, Aberdeen. It stands on a landing composed of five stories geometrically arranged so as to form a regular octagon. The base and column are circular on plan. The underhalf of the portion containing the bowl is circular, and is worked into an octagonal shape above, with eight sunk panels, which will be filled in with brass work. The font was designed by Mr. W. Kelly, architect, Aberdeen, and the work has been carried out by Baillie Taggart, Aberdeen.

BOILER INCRUSTATIONS.—From Messrs. Peters, Bartsch, & Co., Derby, we have received a sample of the chrome salt employed in their patented process for preventing the formation of scale or crust upon the inside of boilers. The salt is bichromate of sodium; it is in the form of hard, red coloured lumps of irregular size, and is readily soluble in water. The reaction of sodium bichromate upon the two most troublesome salts in ordinary boiler waters—viz., calcium bi-carbonate and calcium sulphate may thus be expressed:—

(1) $CaH_2(CO_3)_2 + Na_2Cr_2O_7 = CaCrO_4 + Na_2CrO_4 + 2CO_2 + H_2O$.

(2) $CaSO_4 + Na_2Cr_2O_7 = CaCrO_4 + Na_2SO_4 + CrO_3$.

The value of the process is due to the formation of calcium chromate, which is far more soluble in water than either carbonate or sulphate of calcium. It is claimed that the sediment which at length forms, does not attach itself to the sides of the boiler, but can be readily blown out with the refuse water. The quantity of chrome salt required is as a rule very small, and provided that the chromic acid has no injurious effect upon the boiler there is little doubt that the process will be extensively adopted.

WATER AND SEWERAGE WORKS, COLERAINE, IRELAND.—A Local Government Board inquiry was held on the 6th inst., at Coleraine, concerning the application of the Board of Guardians as the Rural Sanitary Authority, for a supplemental loan of 1,600*l.* for Portstewart water and sewerage works.

FREE LABOUR CONGRESS, MANCHESTER.—The Free Labour Congress, the object of which is to oppose the tyranny of trades-unions over workmen, is to be held at Manchester on October 10. In the annual report of the Executive Council, a copy of which has been sent to us, it is stated that 12,000 workmen have been registered in the books of the Association during the year. Three hundred and twenty employers have made application to the chief and district offices for men, and 13,000 workmen have been sent out, for whom employment has been found. Of these, 9,000 were engaged by the large engineering firms during the late strike.

"BESTO" GLASS, FOR SKYLIGHTS, &C.—This is described, in the circular accompanying the specimen sent to us, as "a new product now being manufactured and put upon the market in the United States and Canada"; consisting of plate glass with a mesh of wire covered with asbestos imbedded in it, giving greater strength to the glass and preventing it falling in any but very small pieces if broken. There is nothing new in the general idea of imbedding wire mesh in glass, however; we noticed a patent glass with wire meshes not very long since. The special feature in the "Besto" glass appears to be the covering of the wire with asbestos before putting it in the glass. This ought to render it more impervious to the action of fire than the bare wire, though we do not notice that any special claim to this effect is made by the patentees in their circular, or indeed any special reason given for introducing the asbestos at all; but we presume that is the reason. It might also prevent the cracking of the glass, to some extent, owing to very rapid variations in temperature, the asbestos acting as a sort of buffer. It is an improvement, no doubt on the plain wire mesh; and that is the chief novelty.

BROOK HOSPITAL: INQUIRY TO BE HELD.—At an ordinary meeting of the managers of the Metropolitan Asylum District, held at the offices of the Board, in Norfolk-street, Strand, on Saturday, the 10th inst., a letter from the Local Government Board was read, stating that they had directed their chief general officer, Mr. W. E. Knollys, C.B., to hold, after the vacation, an inquiry into the causes of the excess of cost over the tenders received for the erection, &c., of the Brook Hospital, the architect's responsibility, and the supervision exercised by the committee and the managers as regarded expenditure.

BRICKMASTERS' EMPLOYERS' LIABILITY ASSOCIATION.—The first and statutory meeting of the Brickmasters' Employers' Liability Association, Limited, was held at the Cannon-street Hotel on August 30, Mr. Wragge (of Messrs. Eastwood & Co.) in the chair. The notice convening the meeting having been read, and the register of members laid on the table, the report of the Directors was read as follows: "Your Directors have pleasure in reporting that the Association has been duly registered as a company, limited by guarantee, and is now fairly established. All the principal stock-brick makers in Kent, Essex, and Middlesex have become members, and other classes have been opened for insurance against risks in flint-getting, barge-building, machine and red brick making, as well as a class for lime, cement, and brick merchants at rates calculated to cover their risks. The amount of wages upon which insurance has been effected with the Association is now 336,000*l.*, and is being increased week by week. A draft of special rules or by-laws for observance by members has been framed and is now engaging the attention of the Board; when approved, copies will be forwarded to members. Members are requested to give immediate notice to the Secretary in the event of an accident occurring to any of their workpeople. The services of Dr. Barrett, of Highgate, have been secured as medical adviser to the Association. A call has been made to meet the expenses of establishment and to provide a balance in hand. In accordance with the articles the Directors retire. They offer themselves for re-election. It was resolved that the report be received and adopted; and that Messrs. Robert L. Curtis, Charles Cremer, George H. Dean, Edward William Goodenough, Alfred J. Knight, Henry Packham, Algernon Rutter, John Willson, and George Edward Wragge be re-elected Directors of the Association. Messrs. D. Wills, J. R. Featherby, and Rosher were nominated as the Audit Committee. A vote of thanks to the Chairman concluded the proceedings.

WE learn that Mr. R. O. Wynne Roberts, of Oswestry, has been appointed City Engineer and Surveyor of Cape Town, at a salary of 800*l.* per annum. Mr. Roberts, who is thirty-five years of age, was for seven years Assistant Town Surveyor of Llandudno, five years Borough Surveyor of Carnarvon, and four years Borough Surveyor of Oswestry.

INSTITUTIONS FOR TECHNICAL EDUCATION.—We have before us the programme for 1898-9 of the Northampton Institute, with classes for mechanical engineering, workshop drawing, practical design of machinery, mechanical laboratory, practical plumbing, brick-cutting, and plastering, drawing and design, goldsmith's work, electrical engineering, &c. The City of London College sends its prospectus of lectures in the Engineering Department by Mr. Henry Adams, including technical drawing and construction, building construction, civil and mechanical engineering, quantity surveying, &c. The Battersea Polytechnic is starting classes in mason's work under the direction of Mr. John Wornell, intended to give practical instruction to apprentices and artizans engaging in mason's work, including the application of descriptive geometry to mason's work, the making of working drawings, and setting out and executing the work in stone. The Aldenham Institute, St. Pancras, announces classes in building construction, carpentry and joinery, plane and solid geometry, and drawing.

PUBLIC WORKS, CARDIFF.—A Local Government Board inquiry has been held at Cardiff regarding an application made by the Cardiff Town Council for the loan of 34,200*l.*, for the purpose of paving Bute-terrace, Adam-street, and part of the Penarth-road with hard wood, and also a number of streets, crossings, and the relaying of footways of certain streets.

ELECTRIC LIGHTING, KING'S LYNN.—On the 7th inst. a Local Government Board inquiry was held at the Town Hall, Lynn, relative to the application by the Town Council for sanction to borrow 30,000*l.*, for purposes of electric lighting, and 820*l.* for the construction of a bridge and for widening the road at the south gates. Professor Robinson explained his plans for the electric lighting installation at considerable length, and gave it as his opinion that it would be a commercial success.

SUSPENSION OF BUILDING OPERATIONS IN ABERDEEN.—Up to Monday last, 480 men, were directly affected by the quarry strike and lock-out, and on that day the Aberdeen Master Masons' Association resolved to suspend all their employees, except apprentices and foremen, until the quarry dispute is settled. This resolution was arrived at in view of the difficulty of procuring a sufficiency of material. As building has been exceptionally active, it is not considered possible that the suspension can last long.

LEGAL.

CASE UNDER THE LONDON BUILDING ACT, 1894.

INFERIOR MORTAR.

AT the North London Police-court, before Mr. d'Eyncourt, Mr. W. E. Stevens, contractor, of Bridge-street, Homerton, was summoned by Mr. Alexander Payne, District Surveyor of East Hackney (South) and North Bow, on the 9th inst., for building houses at Retreat-place, Homerton, of inferior mortar not in accordance with the By-laws made by the London County Council.

Mr. Payne stated that he had received notice from Mr. Stevens for the erection of nine dwelling houses, and four were already nearly constructed; the defendant had removed large quantities of good sand from the ground (presumably for sale), and had used the inferior sand, partly mixed with earthy matter, in these houses. He had frequently warned him about it, and served him a notice of Irregularity on June 15. As there was no material improvement a summons was taken out on August 26. It was shown by the correspondence that Mr. Stevens had complained of the District Surveyor being too sharp on him, and had submitted the material to his own surveyor; but it was admitted that his own surveyor could not approve of the material as being in accordance with the By-laws. On this Mr. Stevens requested that the summons might be withdrawn, but this the Surveyor declined to do.

The defendant was represented by Mr. Romain, solicitor, but no evidence was called and the facts as stated were not controverted.

The Magistrate said that only one summons had been taken out, on which he should certainly inflict the maximum penalty under the By-laws of 5*l.* and costs. If a summons had been taken out on each house he should have inflicted a similar penalty in each case, as it was evident the defendant had been making a considerable profit by using inferior materials, and different to what he professed them to be, in the mortar.

INJURY TO A BUILDING AT BRISTOL BY ALLEGED VIBRATION.

THE case of Beake *v.* Richards came before Mr. Justice Phillimore, sitting as Vacation Judge, on the 14th inst., on the application of the plaintiff to restrain the defendant by injunction from working a saw mill at Bristol so as to cause injury to the plaintiff's house by reason of noise and vibration.

Mr. Alexander, Q.C., for the plaintiff, said that on behalf of his client a course had been suggested, and which it was thought would practically remove the cause of complaint, but this course the other side did not see fit to adopt. The plaintiff's surveyor had seen the *locus in quo*, and had made an affidavit, in which he estimated the cost of alteration at about 250*l.*

His Lordship said that he had read the affidavits which had been filed, and unless something more were done than had been done there must be an injunction and an acceleration as far as possible of the trial of the action. If the matter could not be expedited that day he proposed to expedite the trial, but he wished as little as possible to adjudge the final result. There was very strong evidence, both positive and negative, but his impression on the balance of the affidavits was at present that there was sufficient noise and vibration to cause serious discomfort to the plaintiff and he should not allow the motion to stand over unless something could be done to reduce the vibration and noise.

Mr. Everitt, Q.C., referred, on behalf of the defendant to the affidavits of the surveyors who had inspected the place. The learned counsel said that the plaintiff carried on the not very quiet business of a furniture remover, and the question was whether, having regard to the surroundings, the plaintiff was entitled to an injunction—whether the noise and vibration was such as to amount to a nuisance—and that had to be tested in the ordinary way and not upon affidavits.

His Lordship said the plaintiff's case was that the defendant's place made a horrible noise, and that the plaintiff's wife had, through that original wrong-doing, got into a very nervous condition. Counsel, however, need not trouble about the doctor's evidence; he (Mr. Justice Phillimore) was troubled more about the evidence of the engineer and surveyors.

Mr. Everitt submitted that the case was one in which the alleged nuisance should be determined before an injunction was obtained, and the rules afforded his lordship a discretionary power in such doubtful cases. The defendant had disconnected from the wall all the shafting except one part, and this he was willing now to disconnect, and when that was done he was instructed that the nuisance would be sensibly reduced.

His Lordship suggested to counsel that there should be an order restraining the defendant from working his saw mill at all until he entirely detached all the connexions with the bearings on the party wall so as to get rid of the vibration, and until he had boxed up the engine so as to reduce the noise.

Mr. Alexander said he must ask for his strict rights in this case.

His Lordship said that people sometimes insisted upon their strict rights and did not get them, and suggested that the defendant should detach all bearings and run up a temporary wooden partition between the plaintiff's walls and his. If the defendant was disposed to remove his saw 18 ft. from plaintiff's premises and put up the temporary partition between the side of his engine touching the plaintiff's stables, and detach all bearings, roof the engine house, which was not roofed, so as to be entirely boxed in, his inclination was that that would be sufficient until the trial. He should keep the plaintiff's motion standing over with liberty to replace it in the event of the alterations not being satisfactory or an arrangement come to.

Mr. Everitt observed that in the meantime, if the defendant found he could comply with the recommendations of the plaintiff's surveyors for the removal of the engine-house, an end might be made of the action, the defendant paying the costs.

Mr. Alexander said that an inquiry as to damages might be necessary.

His Lordship: That will be a matter for you to discuss among yourselves. All I do is to restrain the defendant from working unless he does what the plaintiff's surveyor advises, or what I have suggested.

BREACH OF BUILDING COVENANTS.

THE case of Priestman *v.* Oxley and Another came before Mr. Justice Phillimore, sitting as Vacation Judge, on the 14th inst., on the application of the plaintiff to restrain by injunction the breach of certain building covenants contained in the lease of a certain house and shop in Bradford.

Counsel for the plaintiff stated that, by consent, the motion would be treated as the trial of the action, the defendants being restrained perpetually in the terms of the notice of motion, with costs.

ALLEGED OBSTRUCTION OF ANCIENT LIGHTS.

The case of Coles and Others *v.* Salters' Company, which is a motion by the plaintiffs for an injunction to restrain the defendants from the erection of buildings so as to obstruct the plaintiffs' ancient lights, was again mentioned to Mr. Justice Phillimore, sitting as Vacation Judge, on the 14th inst.

Counsel for the plaintiffs stated that his Lordship on the 7th inst. allowed the case to stand over until that day in order that the defendants might file affidavits, but up to 7.30 on the previous night he (counsel) had not seen them. In consequence of this it was necessary for him to ask that the case might be allowed to stand over for another week, but the defendants must understand that they would continue building at their peril.

His Lordship said that the defendants were clearly building at their peril, and made the order asked for.

ALLEGED OBSTRUCTION OF LIGHT AND AIR.

THE case of Warton *v.* Poulter, Limited, and Others, again came on before Mr. Justice Phillimore sitting as Vacation Judge, on the 14th inst., on the application of the plaintiff, Mrs. Warton, the tenant of certain cottages in Collingwood-street, Westminster, for an injunction to restrain the defendant from erecting some stables, 40 ft. high, so as to obstruct the light and air coming to certain windows in the plaintiff's premises.

The defence substantially was that there was no obstruction.

His Lordship, in the result, granted an injunction in the terms of the notice of motion until the trial, the action to be set down at once without pleadings, the costs to be costs in the action.

MEETINGS.

SATURDAY, SEPTEMBER 17.

Dundee Institute of Architecture.—Excursion to Loch Leven, Kinross House, &c.

Northern Architectural Association.—Visit to Jesmond Dene House.

WEDNESDAY, SEPTEMBER 21.

Institution of Builders' Foremen and Clerks of Works.—Ordinary Meeting. 8 p.m.

SATURDAY, SEPTEMBER 24.

Institution of Junior Engineers.—Visit to Sir David Salomon's Laboratories. Leave Cannon-street at 1.35 p.m.

British Institute of Certified Carpenters.—Visit to Eton and Windsor.

RECENT PATENTS:

ABSTRACTS OF ACCEPTED SPECIFICATIONS.

Open to opposition until October 24.

[1897.] 16,900.—METHOD FOR THE GRIPPING OF SCAFFOLDING, LADDERS, &C.: *A. G. Thomas.*—As an improvement of the existing method of lashing, the inventor fixes a length of chain at each end of a wire rope, a hook is fastened to the end of one of the chains, and has its free end lengthened for leverage; the fastening is effected by taking one bight, or more, around the ladders, poles, or scaffolding, drawing the rope taut, passing the hook through a link of the other chain, and passing the hook's end through a loose link on its own chain.

19,135.—SEWER INTERCEPTOR FOR PREVENTION OF BACK-FLOW OF STORM WATER FROM SEWERS INTO HOUSES ON LOW LEVELS: *J. A. Wallis & C. E. Standing.*—The interceptor trap encloses a copper ball which floats on the water in the house side of the trap, and in the event of back-flow of sewage from the main sewer rises in the direction of the fresh-air inlet until it rests against the drain inlet from the house which is provided with india-rubber or compositon seating, so as to form a check to any back-flow: the ball is inserted through a removable cover in the inlet side of the trap, which can also be used as a cleaning eye, it does not obstruct the ordinary flow of soil as the trap has the same area, after the ball is inserted, as has any other part of the drain; the trap is put in the manhole close to the main drain, leaving the remaining drain pipes from the manhole to house connexions as a reserve for any soil or rain water that may accumulate whilst the main drain is overcharged.

19,273.—SHEET ROOFING: *L. Quoilin.*—The invention consists in "a new system of sheet roofing which can be put on easily, quickly, and with security without any folding or soldering." To that end is employed the alternate arrangement of a positive or covering sheet and a negative or shooting-over sheet in one row, the trapeziform sheets being provided with re-curved borders and joined together in an opposite direction, so that they complete themselves reciprocally: the sheets have bulgings for their stiffening.

21,909.—JOINTS FOR DRAIN PIPES AND SIMILAR ARTICLES: *A. Johnson.*—Each drain pipe is fashioned with a spigot end and a socket end. A rabbet of rectangular section is formed in the spigot, and a similar rabbet is formed in the socket. On bringing two ends together an annular cavity is made, to be filled with cement poured through holes made through the pipes.

[1898.] 5,194.—ROAD SCARIFIERS: *R. Bomford, B. Bomford, & H. Evershed.*—The several claims comprise (*a*) a tool carrier or frame, provided with tools or tines, and pivoted to a shaft supported, forwardly, by a regulating wheel which follows the undulations of the ground's surface; (*b*) the employment of springs interposed between the shaft or axis and its connexions with the road locomotive or traction engine; (*c*) springs arranged to encircle respectively the pin or similar connexions between the engine and the shaft, with connecting-rod and shackle; (*d*) a hanging strut-leg or frame, which trails idly along the ground when the engine is moving forwards, but when the engine begins to move backwards, raises the scarifier to such a height as to take the tools out of the ground, and causes a pin on the framing to engage with a catch or hook on the engine; and (*e*) the employment, in conjunction with reversible and taper-ended tools, of tool holders having taper or conical seatings for taking the end thrust of the tools.

8,226.—MANUFACTURE OF ARTIFICIAL STONE AND CONCRETE: *L. P. Ford & T. W. Barber.*—The inventors' object is to remove air from the material before it is slaked in the moulds, to facilitate the slaking process, and accelerate the drying and indurating of the stone; lime and sand are the materials used, with which is combined from 1 to 5 per cent. of a dry powdered alkaline silicate or similar chemical compound; the moulds, when filled, are placed within a vessel, capable of withstanding considerable pressure, which is hermetically sealed, the air is then exhausted, and hot water admitted, after which steam is admitted and the water is allowed to escape, for slaking the lime; for small blocks the dry mixed materials in the moulds may be subjected to a vacuum for about an hour, then to the action of hot water, under a pressure of three to four atmospheres, for the same period, and then (after expulsion of the water) to steam at a pressure of four to five atmospheres for about five hours, after which the steam is shut off and a vacuum created again, the closed vessel being kept the while at a suitable temperature by a steam coil or jacket.

12,902.—A PLASTER OR CEMENT FOR COVERING ROOFS AND WALLS OF BUILDINGS: *J. Goodwin, jun.*—The composition consists of an admixture of ground clay (seven parts), china clay (three), fossil-meal (two), asbestos (two), blue lias lime (ten), and flax or other fibre (two); it is claimed to be specially suitable for covering wooden and iron buildings in tropical countries, and is sold in a dry state.

14,103.—A LEVEL CLINOMETER, OR PLUMB RULE: *G. Krapp & J. Kachelmann.*—In the interior of a straight-edge or rule is placed a casing for the indicating device, which consists of a pendulum screwed on to a spindle, with a hand or pointer that moves over graduations on the dial, and is also secured to the spindle.

15,542.—PROTECTION OF WATER, SEWAGE, AND OTHER PIPES AND TRAPS FROM FROST: *J. Archibald.*—The pipe or trap to be protected is placed within a case or casing, the intervening space is packed with ground cork, flock, sawdust, &c.; for pipes below the ground, or where a metal casing would be liable to rust or corrode, the outer casing may be of wood.

15,545.—PARALLEL RULER: *A. Hill & J. Tatlock.*—The ruler comprises three flat parallel bars, *a*, *b*, and *c*, and two pairs of parallel links, *d*, *e*, which connect the three bars together by studs *n*, *o*, and *x*, so that the bars *a* and *c* open and close parallel-wise; two curved connecting links are also jointed at their left ends to studs *n* and *o*, and at their other ends, on a stud or pin *r*, set and sliding in a slot in the bar *b* and a plate affixed thereto; a set pin and nut *u* slide in the slot, and may be clamped any distance from the stud *r*, so as to regulate its travel; thus by means of the nut *u* the ruler can be set to open to only a prearranged extent, and sectional or other equidistant parallel lines may be drawn.

NEW APPLICATIONS.

August 29—September 3.

18,461, R. Thom, Linoleum and other Floor Coverings. 18,466, B. Naylor, Chimney Top and Ventilator. 18,468, L. N. Bamber, Casements. 18,475, T. A. Edison, Electrical Meters. 18,483, J. Steiger, Cement. 18,487, Von Berks & J. Renger, Composite Plates of Lead, &c. 18,505, D. A. Loisy, Heating Stoves. 18,508, A. E. Greville, Hot-air Bath. 18,510, Gouy & Ribet, Hinges. 18,514-5, W. G. Potter, Gas Burners and Gas Governors. 18,523, J. Shanks, Discharge Apparatus for Water-closet and other Cisterns. 18,533, C. Harrison, Reversible Sliding Windows. 18,543, Bilbie & Drivet, Acetylene Generators or Lamps. 18,559, F. W. Smith, a Bolt. 18,560, A. J. Elliott, Device for Use with Blind Cords, &c. 18,563, E. W. Clement, Measuring Devices for Supply Tanks. 18,566, G. Nuttall, Electrical-light Fitting. 18,574, H. Ralfe, Lock Guards. 18,575, Edwards & Frazer, 18,591, Quatannens-Moens & Carreer-Dilger, 18,741, F. C. Wilson, and 18,835, E. S. Bond, Generating and Burning Acetylene Gas. 18,582-3, B. G. Lamme, Induction Motors. 18,586, D. Ward, Hydro-carbon Burners. 18,594, F. H. Merrill, Pumps. 18,601, G. H. Hope, Smoke Consumer and Fuel Economiser. 18,611, G. Couzens, Circular-saw Guards. 18,614, J. Johnson, Gulley or Stench Traps. 18,616, J. S. E. Lumsden, Automatic Punkah Pulling Machine. 18,619, T. Boustead, Combined Fender and Fireguard. 18,622, H. Wilkinson, Parallel Rulers. 18,629, W. W. Martin, Electrical Contacts. 18,631, D. Smail, a Draughtometer. 18,637, J. Shanks, Moulds for Casting Baths, Cisterns, Tanks, Sinks, &c. 18,647 and 18,654, J. Steiger, Process and Material for Moulding Articles; Hydraulic Cement. 18,658, W. Best, Miners' Safety Lamps. 18,665, Adie & Roberts, Lamps for Heating and Lighting. 18,681, G. A. Abbott, Filters. 18,684, Cook & Others, Wire-fence Machines. 18,689, S. Grossiord, Artificial Stones. 18,699, J. F. Wiles, Measuring Apparatus. 18,702, Schauschieff & Hodgson, Electricity Accumulators. 18,713, W. Milroy, Ring for Pipe-joints. 18,719, A. R. Pollard, for Securing Roofing Slates and Tiles. 18,729, Enamelled Cloisonné. 18,732, J. Sossick, Fire Extinguisher. 18,740, Siemens & Halske A. G., Safety Fuse for Electrical Installations. 18,750, R. Loignion, Coin-freed Electrical Machine. 18,764, W. E. Langdon, Sash Fasteners. 18,768 and 18,770, Riley & Kershaw, Oxygen Gas Generators and Gas Holders. 18,773, W. M. MacFarlane, Rock Drills, Bits, &c. 18,785, A. Vickery, Girders for Building and other purposes. 18,792, H. Cooper, Measuring and Drawing Compasses. 18,796, Corby & Others, Working, Shaping, and Moulding Plastic Substances. 18,806, A. Graham, Telephonic Apparatus. 18,808, Björnstad & Others, Hydraulic Cranes, Hoists, and Lifts, with Indicating and Recording Apparatus. 18,810, Mary Evans, Baths. 18,815, A. J. Collins, Drain Tests and Drain Testing. 18,842, E. F. Smart, Continuous Wire Drawing. 18,847, M. E. Fuld, Electrical Batteries. 18,849, J. Taylor, Measuring Rules. 18,860, A. Mauser, Bars, Fences, Lattice-work, Fillings, &c., and their Manufacture (without waste) from Strip or Band Steel. 18,864, A. H. Alderman, Cleaning and Cleansing Wall Papers, Frescoes, Water-colour Ceilings, &c. 18,879, T. H. Cobley, Colloidal Tannates as Boiler Disincrustants. 18,883, A. Rodriguez, Liquid, Grain, and other Elevators.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 31.—By Messrs. SPELMAN (at Norwich).

Norwich, Norfolk.—87, Waterloo-rd. and the Waterloo Stores (with off license), u.t. 49 yrs., g.r. 1*l.* 5*s.*, r. 27*l.* 15*s.*	£1,100
61 to 85 (odd), Waterloo-rd., u.t. 49 yrs., g.r. 5*l.* 15*s.*	1,145
1, 3, 5, and 7, Traverse-st., u.t. 49 yrs., g.r. 1*l.* 17*s.*	340

September 2.—By WAGSTAFF & SONS.

Holloway.—40, Hampden-rd., u.t. 64 yrs., g.r. 6*l.*, r. 28*l.*	205

September 1.—By WILLSON & PHILLIPS (at Rochford).

Shopland, &c., Essex.—Shopland Hall Manor Farm, 140 a., f.	6,000
Ashingdon, Essex.—Ashingdon Hall Farm, 50 a. 2 r. 3 p., f.	1,550
Enclosures of land, 43 a. 0 r. 4 p., f.	500
Little Stambridge, &c., Essex.—Enclosures of land, 32 a. 2r. 28 p., f.	360

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Extension of Covered Market	Aberavon Corp.	20 guineas	Dec. 1

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Additions to Schools, Nantymoel	Llandyfodwg Sch. Bd.	J. Rees, Archt. Pentre, Glam.	Sept. 20
Two Houses, Marine-parade North, Great Yarmouth	J. Powell	C. G. Baker, Archt. Town Hall-chmbrs.	do.
Filter Beds, Sewage Works	Nelson (Lancs.) Corp.	B. Ball, C.E. Boro Engr. Town Hall	do.
Rebuilding Business Premises, Abertillery, Mon.		Swash & Baio, Archt. Newport, Mon.	do.
Laying Pipes, Water Works	Bantry (Ireland) Union	R. Croly, Board Room, Bantry	do.
Relaying Paving, &c. Bell-street	Tynemouth Corp.	J. F. Smillie, Boro Surv. Town Hall	do.
Schools, Rhymney, &c.	Bedwellty Sch. Bd.	C. Dauncey, Tredegar, Mon.	do.
Electric Tramway Plant	Leeds Corp	City Engr. Municipal-bldgs. Leeds	do.
Manse, Caledon, Ireland	Presbyterian Church Committee	Young & Mackenzie, Archt. Donegall-square East, Belfast	do.
Twenty Houses, Beech, Bowerby Bridge, Yorks.		H. Mitchell, Archt. Warley Town, Bowerby Bridge	do.
Public Wash-house, Stable-street	Liverpool Corp.	W. R. Court, Engr. Cornwallis-st. Baths, Liverpool	do.
Private Street Works, Albert-st. &c.	Amble R.D.C.	W. Gibson, Surv. 31, Queen-street, Amble	do.
Wood and Granite Paving, Mill Dam Quay	South Shields Corp.	S. E. Burgess, C.E. Chapter-row	do.
Enlargement, St. John's Church, Chapeltown, Sheffield		W. J. Sykes, Archt. Hoyland, near Barnsley	do.
*Road-making and Paving Works	Lewisham B. of W.	The Surveyor, Town Hall	do.
*Flagging Dames-road	Fulham Vestry	C. Botterill, Town Hall, Walham Green	Sept. 21
Alterations to Hospital	Plymouth Corp.	G. D. Bellamy, Engr. 6a, Courtenay-st. Plymouth	do.
Power Station, Osborne-street	Hull Corp.	A. E. White, City Engr. Town Hall	do.
Water Supply	Easington R.D.C.	D. Balfour & Son, C.E. 3, St. Nicholas'-buildings, Newcastle-on-Tyne	do.
Sewerage Works, Lockwith-road	Cardiff Corp.	W. Harpur, C.E. Town Hall	do.
Paving, Sewering, &c. Clive-street	do.	do.	do.
Painting Works, &c. at Hospital, Knutsford		R. J. M'Beath, Archt.	do.
Road Works, Abbot's Grange, Grange-mouth	Bucklow Union	Birnam House, Sale	do.
Sewerage Works, Bishop-st. Londonderry	Sir Wm. Miller	A. & W. Black, C.E. Falkirk	do.
Street Works, Garstang-road North	Fylde R.D.C.	R. E. Buchanan, C.E. 33, Shipquay-st Londonderry	do.
Slag Road Metal	Tynemouth R.D.C.	G. Gregson, 102, Fishergate Preston	do.
*Painting at Town Hall and Offices	Fulham Vestry	J. Waters, C.E. Long Benton Newcastle-on-Tyne	do.
Warehouse and Stabling, Preston-st. Bradford	W. Parkinson	Surv. Town Hall, Fulham	do.
Road Works, Oxford-road	Dewsbury Corp.	Fairbank & Wall, Archt. Bradford	Sept. 22
Additions to Two Bay Horses Inn, Old Hunwick, Bishop Auckland		Boro Surv. Town Hall	do.
Warehouse Extensions, Rother Works, Rotherham	Kenyon & Co.	J. H. Livesey, Archt. Bishop Auckland	do.
Sewerage Works, New-street	Irchester P.C.	E. Hutchinson & Son, Surv. 18, Howard-street, Rotherham	do.
Villa, Buckie, N.B.		Sharman & Archer, Archt. Wellingborough	do.
Water Mains	Tamworth R.D.C.	G. Sutherland, Archt. Elgin	do.
Residence and Dispensary, Ringville, Ireland	Dungarvan Union	H. J. Clarson, C.E. 21, Church-st. Tamworth	do.
Public Offices and School	Blaydon U.D.C.	J. R. Dower, Poor Law Office, Dungarvan	do.
Asphalte Paving, &c. Palmeraton-road	Portsmouth Corp.	T. C. Nicholson, Archt. Blaydon-on-Tyne	do.
Sewerage Works, King-street	Hoyland (Yorks.) U.D.C.	Boro Surv. Town Hall	do.
Well Sinking, Crawley, Sussex	District Water Works Co.	W. Farrington, C.E. Town Hall	do.
Retaining Wall, &c. Rutherglen-road	Glasgow Corp.	C. O. Blaber, C.E. 64, Ship-st. Brighton	Sept. 23
Cattle Lairs, &c.	Gloucester Corp.	A. B. M'Donald, Engr. City-chambers	do.
Additions to Workhouse	Stroud (Glos.) Union	R. Read, City Surv. Guild hall	do.
Villa, Land House Estate, Churchtown, Lancs.		W. H. C. Fisher, Rowcroft, Stroud	do.
Walls, Excavating, &c.	Coedfranc Sch. Bd.	Evan Ainsworth, Wrea-green, Churchtown	do.
Warehouse, Quay-road, Bridlington Quay	W. Neal	J. C. Rees, Archt. Church-place, Neath	do.
Two Asylum Buildings	East Sussex County Asylum Visitors	S. Dyer, Archt. Bridlington Quay	do.
Retaining Walls, &c.	Coedfranc Sch. Bd.	R. Carl, County Surv. County Hall, Lewes	do.
Physical Laboratory, Duke-street	Norwich Sch. Bd.	J. C. Rees, Archt. Church-place, Neath	do.
Private Street Works	Durham R.D.C.	C. J. Brown, Archt. Cathedral Offices, Norwich	do.
Granite Road Metal (700 tons)	Sandal Magna (Yorks.) U.D.C.	G. Gregson, Surv. Eastwood, Western Hill, Durham	do.
Chimney Shaft, &c.	Bury St. Edmunds Corp.	Mr. Chadwick, Surv. Belle Vue, nr. Wakefield	do.
Causewaying Church-road	Altofts (Yorks.) U.D.C.	J. C. Smith, C.E. Bury St. Edmunds	Sept. 24
Cartshed, &c.	Exmouth U.D.C.	W. Wilkinson, Council's Offices	do.
Culverting River Walvarden	Nelson (Lancs.) Corp.	W. D. Harding, Town Surv Town Hall	do.
Disinfector House, Upper Bristol-rd.	Bath U.S.A.	B. Ball, C.E. Boro. Engr. Town Hall	do.
Rebuilding George Hotel, Chepstow	R. Hughes	C. B. Fortune, City Surv. Guildhall, Bath	do.
Rebuilding Otterhole Bridge	Buxton U.D.C.	Veall & Sant, Archt. Cardiff	Sept 26
Lightning Conductor, &c.	Darwen Corp.	Town Surveyor, Town Hall	do.
Sewer	Milford (Ireland) Un.	Borough Engineer, Town Hall	do.
*Ventilating Columns and Stoneware Pipe Connexions	Beckenham U.D.C.	S. Walters, Poor Law Offices, Milford	do.
*Widening Roads	do.	John A. Augell, Surv. Beckenham	do.
*Paving Works	Willesden D.C.	do.	do.
*Granite Setts	Coventry Corp.	O. C. Robson, Public Offices Dyne-road, Kilburn	Sept. 27
Enlargement of Post Office, Walsall	H.M. Office of Works	J. E. Swindlehurst, St. Mary's Hall, Coventry	do.
Post Office, Ross	do.	Secretary, Storey's Gate, Westminster, S.W.	do.
Two Reservoirs, Ore	Hastings Corp.	do.	do.
		P. H. Palmer, C.E. Town Hall, Hastings	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Road Materials	Sheerness U.D.C.	C. A. Copland, Surv. Council's Offices	Sept. 27
Schools, Manselton	Swansea U.D. Sch. Bd.	A. W. Halden, Board's Offices, Swansea	do.
Electric Tramway, Sutton and Howth, Ireland	G. N. Ry. Co (Ireland)	Engineer-in-Chief, Amiens-street Terminus, Dublin	do.
*Broken Granite	Edmonton U.D.C.	G. E. Eachus, Town Hall, Edmonton	do.
*Portland Cement		do.	do.
*Infirmary Pavilion	Edmonton Union	T. E. Knightley, 106, Cannon-street, E.C.	Sept. 28
*Underground Convenience	South Shields T.C.	S. E. Burgess, Chapter-row, South Shields	do.
Rebuilding Royal Oak Hotel, Cwm, Mon.		Rosser & Roberts, Archt. Victoria-chmbrs. Abercarn	do.
Sewer and Water Supply, Dunton Green	Sevenoaks R.D.C.	A. Fowler, Surv. Camden-road, Sevenoaks	do.
Sewer, London-road, Westerham	do.	do.	do.
Sewerage Works	Bingham (Notts.) R.D.C.	W. Whitworth, Council's Offices	do.
Destructor House, &c. Clifton-street	Hartlepool Corp.	H. C. Crummack, C.E. Town Hall	Sept. 29
Wood Paving, Market-square	Basingstoke T.C.	G. Fitton, Boro. Surv. Town Hall	do.
*Making-up Roads	Wood Green U.D.C.	C. J. Gunyon, Town Hall, Wood Green, N.	Sept. 30
Grand Hotel, Port Talbot		G. R. Robinson, Archt. Cardiff	do.
Additions to School, Brick-kiln-st.	Wolverhmptn Sch Bd.	T. H. Fleming, Archt. 102, Darlington-st. Wolverhampton	do.
Cast Iron Pipes, Buddles, Adit, &c.	Calstock (Devon) R.D.C.	J. P. Blight, Callington	do.
Orphanage, Bridlington	Yorkshire Foresters	R. J. Beale, Archt. 9 Victoria-street, S.W.	do.
Waterworks	Pembroke T.C.	F. Beasley & Son, Engrs 11, Victoria-street, S.W.	Oct. 1
Additions, &c. to Old Gaol	Dartmouth T.C.	T. O Veale, Boro. Surv. Castle View	do.
*Iron and Stoneware Pipe Sewers	Epping U.D.C.	Urban Smith, C.E. 41, Parliament-st. S.W.	do.
Electric Light Installation, Portraine, Dublin	Asylum Visitors	J. Edmundson, Engr. 9, Orwell-park, Rathgar, Dublin	Oct. 3
Reservoir, Melbury Moor, Devon	Northam U.D.C.	B. Latham, C.E 13, Victoria-street, S.W.	do.
*Repairing Works, Machinery, Pumping Works, &c.	London C.C.	Engineer's Dept. Spring Gardens, S.W.	Oct. 4
*Erection of Dwellings, Bethnal Green and Limehouse	L.C.C.	Archt.'s Dept. 17, Pall Mall East, S.W.	do.
*Caretaker's House	Bexley Sch. Bd. (Kent)	W. J. Weaving, 199, Broadway Bexley Heath	do.
Refuse Destructor	Ramsgate T. C.	T. G. Taylor, Surv. Broadstreet	Oct. 5
Extension of Dunstan Staithe	N. E. Ry. Co.	C. A. Harrison, Central Statn. Newcastle-on-Tyne	do.
*Visitor's Room and Engineer's House at Schools	Holborn Union	C. E Vaughan, 25, Lowther-arcade E.C.	do.
*Lighthouse Dwellings	Trinity House Corp.	C. G. Verity, 31, Golden-square, W.	Oct.
*Heating Apparatus, &c. Asylum, Knowle, Fareham	Visitors	W. J. Taylor, County Surv. The Castle, Winchester	Oct. 11
*Police Station, Swanage	Dorset Stand. Joint Com.	W. J. Fletcher, Wimborne	Oct. 12
Kitchens, &c. at Sanatorium, Astley	Leigh Joint Hospital Board	Banks Fairclough & Co. Archt. Leigh, Lancs.	do.
*Workhouse	Greenwich Union	T. Dinwiddy, 12, Croom's-Hill, Greenwich	Oct. 13
*Alterations and Additions to Schools	Ruthin County School Govrs.	E. Roberts, Solicitor, Ruthin	Oct. 17
*Public Baths	Birkenhead Corpn.	C. Brownridge, Town Hall, Birkenhead	do.
*Additions to Asylum, Cholsey	Berkshire Lunatic Asylum Com.	G. T. Hine, Archt. 35, Parliament-st. S.W.	Oct. 20
*Water Supply, City of Belem, Para, Brazil	Brazilian Consulate		Nov. 10
Additions to No. 6, Bank-st. Ashford	J. H. Bartlett	S. A. Dunn, Archt. 27, Sussex-avenue, Ashford	No date
Villa, &c. Staplehurst		W. Brook, Archt. Staplehurst	do.
Building Materials, Hatton, Warwick	Asylum Visitors	Secretary, County Lunatic Asylum, Hatton	do.
Schools, near Wakefield	Hemsworth Sch. Bd.	W. R. Richardson, Archt. Bond-street, Leeds	do.
Hotel, Kendal	Whitwell, Mark & Co.	J. Stalker, Archt. Kendal	do.
Two Cottages, Oxhill, Stanley, Durham	J. Todd	W. T. Jones, Archt. North Bailey, Durham	do.
Pair Villas, Whitchurch	Richards & Walters	E. J. Jones, Arct. 104, St. Mary-street, Cardiff	
Cottage Hospital, Hinckley		J. Wigg, Archt. Berridge-street, Leicester	do
Six Houses, Ashton-under-Lyne		T. D. Lindley, Archt. Ashton-under-Lyne	do
Business Premises, High-st. Buxton	M. Salt	Garlick & Flint, Archt. Terrace-road, Buxton	do.
Additions to Floshfield, Nelson School, Wigton		Oliver & Dodgshon, Archt. Carlisle	do.
Additions to Granby Hotel, Harrogate	Granby Hotel Co. Ltd.	Bland & Bown, Archt. North Park-rd. Harrogate	do.
Road Metal	Barnard Castle U.D.C.	J. I. Dawson, Council's Offices	do.
Lodge, Stabling, &c Langley Castle, Haydon, Bridge-on-Tyne	C. J. Bates	H. W. Taylor, C.E. Archt. Newcastle-on-Tyne	do.
Additions to Business Premises, Kyrle-street, Hereford	Industrial Aid Soc.	W. W. Robinson, Archt. 10, King-street, Hereford	do.
Two Houses, Hipperholme, Yorks		J. F. Walsh, Archt. Hipperholme	do.
Two Houses, Castleford		G. F. Pennington, Archt. Central-chmbrs Castleford	do.
Five Houses, Southgrove-rd. Sheffield		W. Saynor, 60, Charles-street, Sheffield	do.
Stone Bridge, Tanton, nr. Stokesley	North Riding C. C.	W. Stead, C.E. County Surv Northallerton	do.
Workshops, Engine Houses, &c. Globe-road, Leeds	Harding & Co.	W. Bakewell, Archt. 38, Park-square, Leeds	do.
Sewerage Works	Ashton-under-Lyne Corp.	J. T. Earnshaw, C.E. Town Hall	do.
Additions to Houses, Coatsworth-road, Gateshead	W. H. Scott	J. G Crone, Archt. 50, Grainger-st. Newcastle-on-Tyne	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Secretary and City Manager for Waterworks	York Waterworks Co.	300l. &c.	Sept. 21
*Architectural Assistant	London C.C.	3l. 3s. per week	Sept. 23
*Two Clerks of Works	School Board for London	150l. rising to 250l. per ann.	Sept. 24
*Two Sanitary Inspectors	Chelsea Vestry	120l. rising to 180l. per annum each	Sept. 29
*Boro Engr.'s General Assistant	Plymouth Corp.	100l. rising to 130l. per ann.	Oct. 1

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, p. iv. *Contracts*, pp. iv. vi. viii. ix. & xix. *Public Appointments*, pp. xvi. & xi.

September 3.—By Messrs. SPELMAN (at Norwich).

Wymondham, Norfolk.—Dykebeck Farm, 112 a. 3 r. 26 p., f. and c..... £1,920

September 5.—By WHITE & SONS.

Leatherhead, Surrey.—High-st., The Swan Hotel, u.t. 60 yrs., r. 100*l.*, with goodwill 13,300

By REBBECK BROS. (at Bournemouth).

Bournemouth, Hants.—1 and 2, Granville Villas, 1, Granville, and seven residences adjoining, f., r. 360*l.* 6,500

Alum Chine-rd., Gloucester and Wilton House, f., r. 175*l.* 2,550

1 and 2, Cheltenham-villas, f., r. 65*l.* 1,125

Branksome-ter. (rear of), three cottages, workshop, &c., u.t. 81 yrs., g.r. 10*l.* 10s., r. 65*l.* .. 1,275

1, 2, and 3, Myrtle-cottages, u.t. 76 yrs., g.r. 9*l.* 9s., r. 72*l.* 1,025

1 and 2, Branksome-cottages, u.t. 77 yrs., g.r. 6*l.*, r. 51*l.* 500

1 and 2, Osmund-cottages, with smithy, &c., adjoining, u.t. 88 yrs., g.r. 6*l.* 6s. 850

1, 2, and 3, Warmwell-cottages, f., r. 40*l.* 550

Poole, Dorset.—13 and 14, Kingland-pl., 1 and 2, Laburnum-cottages, and 1 to 4, Exeter-cottages, u.t. 34 yrs., g.r. 1*l.* 11s. 6d. 700

By STEPHENSON & ALEXANDER (at Cardiff).

Cadoxton, Glamorgan.—Guy's-rd., the Barry Dock and District Steam Laundry, with goodwill, u.t. 985 yrs., g.r. 17*l.* 1,975

September 6.—By F. MILLER & REID.

Lewisham.—Dermody-rd., Cambridge House, u.t. 81 yrs., g.r. 7*l.* 10s., r. 33*l.* 225

By RUTLEY, SON, & VINE.

Stockwell.—50, Stockwell Park-rd., u.t. 27 yrs., g.r. 10*l.*, r. 46*l.* 295

Kentish Town.—87, Harmood-st., c., r. 34*l.* 515

Hampstead-rd.—30, Harrington-sq., u.t. 44 yrs., g.r. 11*l.*, r. 70*l.* 685

Highbury.—Highbury-cres., f.g.r. 45*l.*, reversion in 99 yrs. 1,250

By STEPHENSON & ALEXANDER (at Cowbridge).

Llansanor, Glamorgan.—Two freehold fields, 7 a. 0 r. 24 p. 410

The Windmill Farm, 235 a. 0 r. 23 p., f. 3,350

The Llansanor Court Estate, 409 a. 3 r. 20 p., f. 12,900

Enclosures of land, 94 a. 0 r. 11 p., f. 2,500

Cae Graig lands, 4 a. 2 r. 20 p., f. 200

Penlline, Glamorgan.—A freehold field, 7 a. 0 r. 14 p. 240

The Fistla Farm, 181 a. 1 r. 25 p., f. 550

Llanbleddian, Glamorgan.—The Upland Farm, 82 a. 3 r. 6 p., f. 2,100

Colwinstone, Glamorgan.—Golden Mile Farm, 25 a. 1 r. 14 p., c. 1,600

By BEAN, BURNETT, & ELDRIDGE (at Lewes).

Lewes, Sussex.—Prince Edward's-rd., freehold rent charges of 10*l.* 14s. 6d. 271

By SOUTH & WILKINSON (at Tean).

Tean, Staffs.—High Fields Farm, 95 a. 2 r. 11 p., f. 4,250

Spitchell's Field, 3 a. 0 r. 21 p., f. 310

Two cottages and gardens, f. 405

By HAMPTON & SONS (at Lewes).

Hailsham, &c., Sussex.—Magham Down Farm, 77 a. 3 r. 3 p., f. 1,335

A freehold cottage and 2 r. 7 p. 170

Amberstone Farm, 161 a. 3 r. 9 p., f. 2,110

Hailsham, Sussex.—Two cottages and enclosures, 34 a. 0 r. 16 p., f. and c. 710

Hellingly, Sussex.—Cottage, lodge, and enclosures, 30 a 3 r. 5 p., f. 700

Enclosure of land, 16 a. 1 r. 28 p., f. 600

Holmbush Farm, 81 a. 3 r. 25 p., f. and c. 1,500

Framfield, Sussex.—Tuetts and Squires farms, 34½ a., f. and c. 1,500

Hove, Sussex.—Spray's Farm, 35 a. 0 r. 30 p., f. 340

Warting, Sussex.—Carter's Corner Farm, 46 a. 1 r. 1 p., f. 1,010

Chiddingly, Sussex.—Swansbrook Wood, 31½ a., f. 220

September 7.—By DOUGLAS YOUNG & CO.

Lewisham.—Morley-rd., &c., i.g.r. 91*l.* 10s., u.t. 80 yrs., g.r. 6*l.* 1,200

Wandsworth.—111 and 113, The Grove, f., r. 95*l.* 1,120

Lambeth.—16 and 18, Westminster Bridge-rd., u.t. 20½ yrs., g.r. 18., e.r. 150*l.* 40 0

By P. & G. GEEN.

Hammersmith.—65, Rednall-ter., u.t. 81 yrs., g.r. 5*l.* 205

Pentonville.—1, Southern-st., r. 77*l.*; also 1 g.r. 9*l.*, u.t. 27½ yrs., g.r. 1*l.* 900

By H. J. CHEFFINS (at Masons' Hall Tavern).

Roydon, Essex.—The Eagle b.-h. and 0 a. 2 r. 25 p., f. 1,000

September 8.—By H. S. R. STANFORD (at Halesworth).

Spexhall, &c., Suffolk.—Girling's Farm, 81 a. 0 r. 33 p., f. 750

By FRANCIS & CO.

Stockwell.—25, Rumsey-rd., u.t. 83 yrs., g.r. 8*l.* 10s., r. 46*l.* 500

By NOKES & NOKES.

Forest Hill.—2, Como-rd., f., e.r. 28*l.* 310

By WYATT & SON (at Chichester).

Chichester, Sussex.—York-rd., freehold house and two cottages 630

21 and 22, St. James'-rd., f. 160

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G. ton	8/0/0	0/0/0
Teak, E.I....load	10/10/0	15 10/0
Sequoia, U.S.ft.cu.	1/9/0	2/-/0
Ash, Canada, load	4/5/0	5/10/0
Birch, do.....	4/0 0	5/15/0
Elm, do.....	5/0/0	6/0/0
Fir, Dantsic, &c..	2/10/0	4/10/0
Oak, do.....	2/0/0	4/0/0
Canada	4/0/0	6/c/o
Pine, Canada red	0/0/0	0/0/0
Do. yellow	4/5/0	6/5/0
Lath. Dantsic,fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	6/10/0
Wainscot, Riga, &c., log.....	4/5/0	6/5/0
Odessa, crown....	4/5/0	6/5/0
Deals, Finland and & 1st std 100	9/10/0	10/10/0
Do. 4th & 3rd ..	9/10/0	10/10/0
Do. Riga	8/0/0	9/0/0
St. Petersburg, 1st yellow	11/10/0	14/0/0
Do. 2nd yellow.	10/10/0	12/0/0
Do. white.....	9/10/0	11/10/0
Swedish	9/10/0	16/10/0
White Sea	10/10/0	17/15/0
Canada, Pine 1st	18/0/0	24/10/0
Do. do. 2nd	13/0/0	16/10/0
Do. do 3rd, &c.	6/0/0	9/10/0
Do. Spruce, 1st	8/10/0	10/10/0
Do. do. 3rd and and	7/0/0	8/10/0
New Brunswick	7/0/0	8/0/0
Battens all kinds	5/0/0	16/0/0
Flooring boards, sq., 1 in. prep. 1st.....	9/6	16/0
Do. 2nd	8/0	13/0
Other qualities—	6/3	7/0
Cedar, Cuba, ft.	/4	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba	/5½	/1⅛
St. Domingo, cargo av.	/5	0/3/3
Mexican, do. do.	/3½	/4
Tobasco, do. do.	/4	/6½
Honduras, do.	/4	/6
Box, Turkey, ton	4/0/0	15/0/0
Rose, Rio	7/0/0	14/0/0
Bahia	6/0 0	12/0/0
Satin, St. Doming.	0/0/5	0/1/0
Satin, Porto Rico	0/0/9	0/2/0
Walnut, Italian ..	0/0/3	0/0/7

METALS.

Iron—Pig, in Scotland .....ton	2/8/0½	0/0/0
Bar, Welsh, in London	5/15/0	5/17/6
Do. do. at works in Wales	5/10/0	5/12/6
Do. Staffordshire, in London.....	6/5/0	7/10/0
COPPER—British cake and ingot	55/10/0	56.0/0
Best selected ..	56/0/0	56/10/0
Sheets, strong..	61/0/0	61/10/0
Chili bars	51/17/6	0/0/0
YELLOW M.L. lb.	5d.	5½d.
LEAD—Pig Spanish ....ton	13/0/0	0/0/0
English com. bands	13/5/0	0/0/0
Sheet, English 6 lbs. per sq. ft. and upwards ..	14/5/0	0/0/0
Pipe.....	14/15/0	0/0/0
ZINC—English sheet.....ton	25/0/0	0/0/0
Vieille Montagne	25 10/0	0/0/0
Spelter	21/15/0	22/0/0
TIN—Straits	73/18/9	0/0/0
Australian.....	74/10 0	74/15/0
English Ingots..	76/10/0	77/10/0
Banca	0/0/0	0/0/0
Billiton	/0/0	0/0/0

OILS.

Linseed .....ton	17 0.0	0.0.0
Cocoanut, Cochin	27/15/0	0/0/0
Do. Ceylon	22/0/0	0/0/0
Palm, Lagos	21/15/0	0/0/0
Rapeseed, English pale	27/10/0	0/0/c
Do. Brown	26/0/0	c/0/0
Cottonseed ref. ..	14/5/0	15/5/0
Oleine.....	13/10/0	14/10/0
Lubricating U.S.	0/5/3	0/7/6
Do. Black	0/5/0	0/6/6
TAR—Stockholm barrel	1/5/0	0/0/0
Archangel.....	0/12/6	0/0/c
Turpentine .....cwt	1/15 0	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100 unless in some exceptional cases and for special reasons.]

ANNFIELD PLAIN (Durham).—Accepted for the construction of conveniences, for the Urban District Council. Mr. T. J. Trowsdale, surveyor, Council Offices, Annfield Plain:—
Joseph Dunn, Annfield Plain £107 7 9

BELVEDERE, Kent.—For erecting two small houses, providing drainage to laundry, &c., for Mr. Wm. Smith. Mr. John H. Wills, architect, 18, Dagmar-road, Camberwell, S.E.:—

	H uses.	Retaining Wall.	Drainage to Laundry.
H. E. Chandler, Belvedere ...	£585	£75 0	£52
T. Freeman & Son, Camberwell	600	52 10	38
L. L. Leeder & Co., Chiswick	487*	50 0*	50*

* Accepted.

BOSTON SPA.—For the execution of drainage and outfall works, for the Wetherby Rural District Council:—

Contract No. 1.

H. Wilson.....	£6,173 8 0	A. Braithwaite & Co	£5 344 17 6
W. Brigg	5,931 8 0	M. Hall & Sons	5,189 10 0
M. Arundel	5,822 15 0	H. M. Nowell ...	5,103 0 0
Graham & Son.....	5,700 0 0	W. Bians, Bradford*	4,941 10 4

* Accepted.

CHIGWELL.—For the erection of ophthalmic buildings at Chigwell, Essex. Mr. A. E. Pinder, architect:—

F. V. Carter.....	£5,004	A. Porter	£5,733
W. Keefe	5,890	W. Gregor & Son	5,678
George & Hosking	5,837	W. Shurmur	5,336
H. Reed	5,745	F. G Minter	5,003
W. M. Norton	5,747	Smith & Sons	4,998

CHINGFORD.—For the erection of factory at Hale End, Chingford. Mr J. Rookwood, architect:—

W. Shurmur.....	£3,528	F. F. Chinchen	£3,470
Harris & Wardsop	3,519		

DEVONPORT.—For the construction of a public convenience, Northcorner Quay, for the Town Council. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, Ker-street, Devonport:—

J. Healy	£264	H. E. Skinner	£218
T. Jenkin & Son	229	S Perkins, Devonport*	198

* Accepted.

EWELL (Surrey).—Accepted for the erection of villa at Ewell, for Mrs. Omar. Messrs. C. Richards & Co., surveyors, 15, Wallbrook, E.C.:—
L. L. Leeder & Co., Chiswick £557
Four tenders sent in.

GLEN PARVA.—Accepted for the erection of six small villa residences, for Mr. W. H. Simpson. Messrs. Simpson & Harvey, architects, Leicester:—
D. Halford & Sons, Blaby..... £1,830

KILKENNY.—For additions to workhouse, for the Union Guardians, Mr. J. F. Reade, C.E., John-street, Kilkenny:—

W. K. Cleere, Kilkenny ..	£252	John Dowling, Freshford ..	£243

* Accepted.

LEICESTER.—Accepted for the re-building of shop premises in High-street, Leicester, for Mr. William Hill. Messrs. Simpson & Harvey, architects and surveyors, Leicester:—
Charles Wright, Leicester £550

LEICESTER.—For the construction of new roads and sewers on the Grange and D'Oyly Estates, for Mr. William Elliott. Messrs. Simpson & Shardlow, architects and surveyors:—

T. Philbrick, Leicester.....	£8,690 0 0	Stimson & Rollston*	£8,021 14 4
Bentley & Loch	8,271 2 3		

* Accepted

LONDON.—For rebuilding the "Alexandra Hotel," Wood Green. Mr. A. E. Pridmore, architect:—

Beer & Gash.....	£2,697	W. Shurmur.....	£2,242
Knight & Son	2,650	Marchmont & Hirst.....	2,215
J. Tennant	2,386	P. Hart	2,208
L. R. Lamble	2,381	W. Davenport	2,156
F. Wailer	2,291	J. Pocock	1,997
Kilby & Gayford	2,290		

LONDON.—For erecting two blocks of artisans' dwellings at High street, Shadwell. Mr G Drew, architect:—

Holloway Bros.....	£10,912	H. L. Holloway	£8,743
Clark & Bracey	9,997	W. Shurmur.....	8,608
B. E. Nightingale.....	9,633	S. J. Scott.....	8,552
Calman & Sons.....	9,356		

LONDON.—For erecting a Mission Church, Chatsworth-road, Clapton. Mr. B. Crewe, architect:—

L. & H. R. Roberts.....	£7,389	S. B. Pitcher.....	£6,598
Godfrey & Son	7,237	W. Shurmur.....	6,597
Lascelles	6,895	Dearsley.....	6,400
Roome	6,805		

LONDON.—Accepted for erecting two houses (arranged as self-contained flats), Fulham, for Mr. Erbach. Mr. Hall, surveyor, Fulham-road:—
L. L. Leeder & Co., Chiswick £6,200

LONDON.—For alterations and repairs to the "Bell" public house, Felton-street, Hoxton, N., for Messrs. Chandler & Co. Mr J. G. Needham, architect, 18, Lower Clapton-road, N.E.:—

T. H. Jackson	£327 5	A. & T. Wilson*	£207 0
R. Ridgeway & Sons....	229 10		

* Accepted.

Gasfitting.

J. Steadman £25 10

LONDON.—For the erection of two blocks of flats, Trouville road, S.W., for Messrs. Joyce & Hall. Messrs. Bochmer & Gibbs, architects, 11, Spring-gardens, S.W.:—

Turtle & Appleton	£9 330	L. Whitehead & Co.,	
Britton	9,200	Ltd. (accepted)	£9 250

LONDON.—Accepted for the erection of engine and boiler houses, for the City and South London Railway:—
L. Whitehead & Co., Ltd. £10,749

LONDON.—For the erection of two shops at Rosslyn Hill, Hampstead, for Dr T. G. Munyard. Mr. E. H. Sim, architect, 8, Craig's-court, Charing Cross. Quantities by Mr. J. G. W. Buss:—

Bywaters & Sons	£3,760	A. Bush	£3,377
Holloway Bros.	3,580	L. Whitehead & Co., Ltd.	3,265

LONDON.—For renovations, &c., at No. 3, Arlington-street:—
W. Holt & Sons, Croydon..... £1,357

LONDON.—For the erection of a factory at 17, Albion-street, King's Cross, N., for Messrs. Stephenson, Mager & Co. Mr. H. A. Emmett, architect, Monnery-road, Tufnell-park, N.:—

Holliday & Greenwood	£4,089	
Extra for lead roof.....	129	
		£4,218
Patman & Fotheringham	£3,791	
Extra for lead roof	87	
		£3 878
Scrivener & Co	£3,129	
Extra for lead roof	97	
		£3,226
Foord & Sons (of Brentford) (accepted)	£2,985	
Extra for lead roof	96	
		£3,081

LONDON.—For erecting a warehouse at Bayer-street, Golden lane, E.C. Mr. J. Groome, architect:—

H. Irving	£5,344	W. Shurmur.....	£4,721
Woodward & Co.	4,926	Mattock Bros	4,677
Kilby & Gayford	4,836	Grover & Son	4,546
H. L. Holloway	4,793	J. Greenwood	4 533

LONDON.—For rebuilding Nos. 70 and 71, Shoe-lane, E.C. Mr H. Knight, architect:—

Nightingale & Co.....	£4,493	Turtle & Appleton	£4 070
Woodrow	4,370	Chase & Son	3,597
W. Shurmur.....	4,091		

LONDON.—For erecting new premises at Hackney for the Hackney Furnishing Company. Mr. J. Hamilton, architect:—

Marten & Sons	£3,910	Snewin Bros.	£3,399
T. Grover & Son	3,650	W. M Dabbs	3,360
B. E. Nightingale	3,685	Jarvis & Sons	3 177
W. Smith	3,529	W. Shurmur.....	3,141
G. W. Beale	3,477		

LONDON.—Accepted for the re-erection of houses and shop premises at Nos. 32 and 34, Leman-street, Whitechapel, for Mr Louis Sampson. Mr. W. A. Longmore, architect, 7, Great Alie-street, E.:—
A. Brown, Commercial-road, E. £915

LONDON.—For the erection of a warehouse at Great Arthur-street, Golden-lane, E.C. Mr. J. Groome, architect:—

Woodward & Co	£2,494	Grover & Son	£2,270
Kilby and Gayford	2,436	J Greenwood	2,271
H. L. Holloway.....	2 390	H. Irving	2,262
W. Shurmur	2,366	Mattock Bros.	2,259

LONDON.—For wiring for electrical installation, together with electric bells, at Abbey Court Mansions, N.W. Messrs. Metcalf & Greig, architects:
Sharp, O'Brien, & Co., Minories £403

LONDON.—For heating on the Low Pressure System a house, conservatory, &c., in Carleton-road, N.W., for Mr. C. Cheswright:—
Sharp, O'Brien & Co., Minories £141

LONDON.—For the enlargement of the Poor Law Offices, Isleworth, for the Guardians of the Poor of the Brentford Union. Mr. W. H. Ward, architect, Paradise-street, Birmingham. Quantities by Mr. F. W. T. Miller, surveyor, 10, Delahay-street, Westminster, S.W.:—

T. Hiscock	£1,296	Dorey & Sons	£1,055
W. Wisdom	1,087	T. J. Messan, Twickenham*	1,023
T. Nye	1,070		

* Accepted.

MARSTOWN.—Accepted for the erection of four small villa residences, for Mr. W. H. Simpson. Messrs. Simpson & Harvey, architects, Leicester:—
D. Halford & Sons, Blaby £1,030

MIDDLESBROUGH.—For the erection of business premises, Newport-road, for Mr. J. W. Read. Mr. W. G. Roberts, architect, 61, Albert-road, Middlesbrough. Quantities by Fred Cartwright, Foster's Buildings, Sheffield:—

Full Tenders.

J. Howe & Co.	£1,760 0 0	Watling	£1,680 0 0
Allison Bros.	1,739 0 0		

Excavating, Drainage, and Bricklaying.

J. Johnson	£813 3 1	D. Doughty	£702 3 7
Bastiman Bros.	741 5 10	W. Pounder*	669 8 1
J. Coates	728 18 4		

Masonry.

D. Doughty	£54 4 5	W. Pounder	£49 17 0
Bastiman Bros.	52 0 0	J. Coates*	37 13 9

Joinery and Carpentry.

W. A. King	£468 12 10	R. Sweeting	£378 16 0
Hudson Bros.	460 15 0	G. P. Petch*	313 8 0

Plastering.

Bastiman Bros.	£150 2 5	G. E. Tarron	£139 0 0
J. Johnson	119 1 11	J. Coates	103 0 0
J. R. Smiles	145 10 0	D. Pattison*	103 0 0

Slating.

J. & P. Mascall	£62 18 0	W. Tyreman	£61 15 0
J. Harrison	62 10 0	W. B. Robinson*	59 0 0

Excavating, Bricklaying, Drainage, Carpentry, and Joinery.

Allison Bros. £1,250 0 0

Ironfoundry, Plumbing, Glazing, and Gasfitting.

G. Ripley	£953 5 2	Curtice & Bowman*	£214 0 0
Baker Bros	250 0 0		

Painting.

A. Lewis	£33 14 3	J. H. Hill*	£30 5 2
E. Turner	32 19 9		

* Accepted.

NEW MALDEN.—For erecting four houses at New Malden. Mr. R. Allsebrooke Hinds, architect, Hill-road, Wimbledon, S.W.:—

Spilbey & Smith	£2,650	W. Rice	£3,097 10
Whone & Sons	3,590	W. J. Shelley	2,911 0
W. C. Cheshire	2,200	S. Buxton	2,556 0

NEWPORT.—For sewerage works and making new road, for the trustees of the Power Estate, Newport:—

F. J. Collier	£533	John Charles*	£475
Jewell & Son	468		

* Accepted.
[All of Newport.]

NORWICH.—For alterations, including the provision of a dealers' settling room, and for other works at the Cattle Market office. Mr. Arthur E. Collins, City Engineer, Norwich:—

J. Evans	£572 0	Burton & Son	£355 10
A. Hipperson	405 0	R. Daws & Son	347 0
R. Bayes	393 0	Tyrrell Bros., Norwich *	343 0

* Recommended for acceptance.

OXFORD.—For the extension of sewerage works, for the Corporation. Mr. W. H. White, City Engineer, Oxford:—

Contract No. 1.

B. Cooke & Co.	£9,155 0 0	Batchelor & Snowden, Cardiff*	£8,669 19 4

* Accepted.
[City Engineer's estimate, £8 7c9 12 10.]

OXFORD.—For the erection of cottages, &c., Littlemore and Sandford-on-Thames (contract No 2), for the Town Council. Mr. W. H. White, C.E., Town Hall, Oxford:—

Organ Bros.	£1,593 1 8	W. Polley	£1,348 19 6
Ward & Son	1,478 0 0	W. Rose	1,321 13 9
J. Wooldridge	1,471 15 11	F. Phipps (accepted)	1,225 12 4

[All of Oxford].

SLOUGH.—Accepted for the execution of private street works, Chalvey Vale, for the Urban District Council. Mr. W. W. Cooper, surveyor, 1, Mackenzie-street, Slough:—

W. Lee & Son, High Wycombe £734 19 7

SOUTHAMPTON.—For the erection of school buildings, Ludlow-road, Woolston, for the U.D. School Board of St. Mary Extra, Sholing and Hound. Messrs. Mitchell, Son, & Gutteridge, architects, 9, Portland-street, Southampton:—

Witt Bros.	£6,950	Jenkins & Sons	£6,097
Playfair & Toole	6,846	Rashley	5,946
H. Cawte	6,137	Hinton Bros., Woolston,	
H. Stevens & Co.	6,123	Southampton*	5,411

* Accepted subject to approval of Education Department.

STOWMARKET.—For additions, &c. to a warehouse, Bury-street, for Messrs. G. Thurlow & Sons. Mr. H. G. Bishop, architect, Cheapside, Stowmarket:—

Taylor	£590	Theobald & Sons	£485
Murray, Stowmarket*	500		

* Accepted.

SWINDON (Wilts.).—For the erection of schools and hall, Holy Rood, for the managers. Messrs Silcock & Reay, architects, Octagon Chambers, Milsom-street, Bath:—

Hawkins	£5,860	Flewelling & Huckson	£5,303
Flint	5,787	Hayward & Wooster	4,994
Williams	5,552	J. Long & Sons, Bath	4,633
Merredew & Wort	5,534		

* Accepted subject to certain deductions.

WALTHAMSTOW.—For the erection of public baths, for the Urban District Council. Messrs. Spalding & Cross, architects, 15, Queen-street, Cheapside, London, E.C. Quantities by Mr. George T. G. Wright, 3, Great Winchester-street, E.C.:—

Gould & Brand	£16,895	F. W. Smith	£15,678
Walter Lawrence	16,800	J. Allen & Sons	15,500
Kirgerlee & Sons	16,575	Balaam Bros.	15,450
C. G. Hill	16,300	General Builders, Ltd.	15,000
W. Shurmur	16,290	Huntley Bros.	14,899
J. Chessum & Sons	15,922	Killby & Gayford	14,836
T. E. Mitchell	15,887	Merredew & Wort	14,627

WHITSTABLE (the Tankerton Estate).—For the erection of two fourteen-roomed villas. Mr. Smythl, surveyor, London:—

Hardwell, Sons & Co.	£1,600	L. L. Leeder & Co.*	£1,512
W. R. Smith	1,520		

* Accepted.

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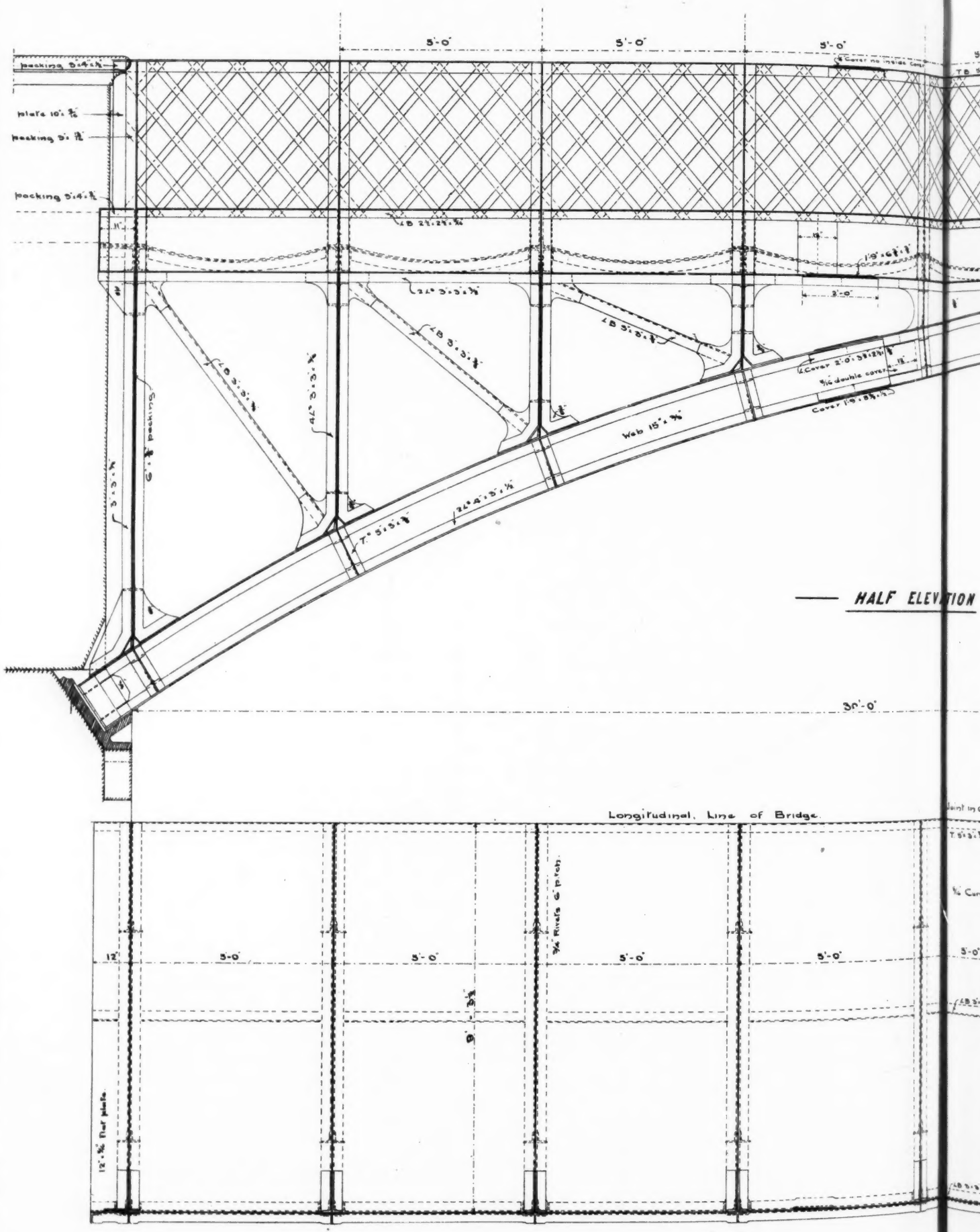

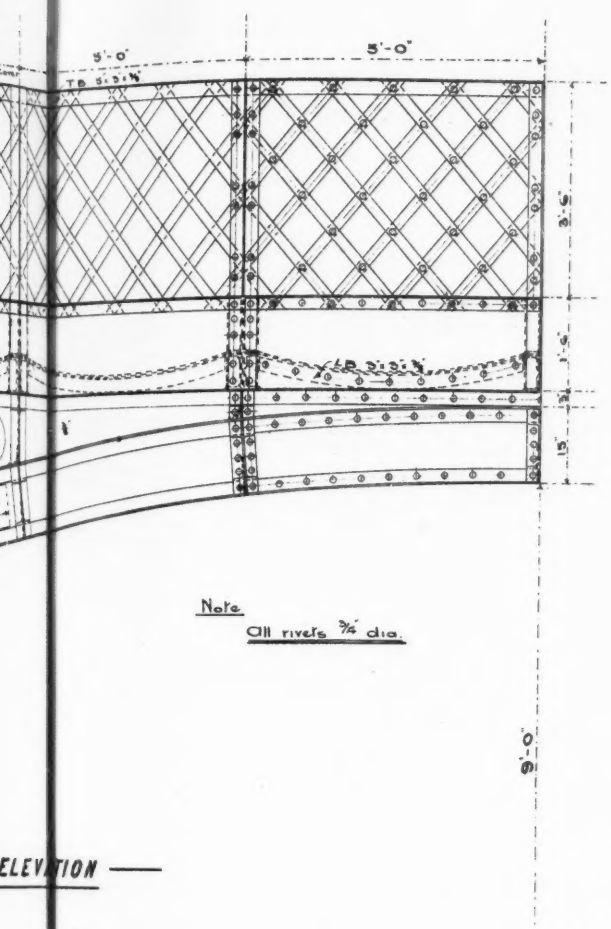

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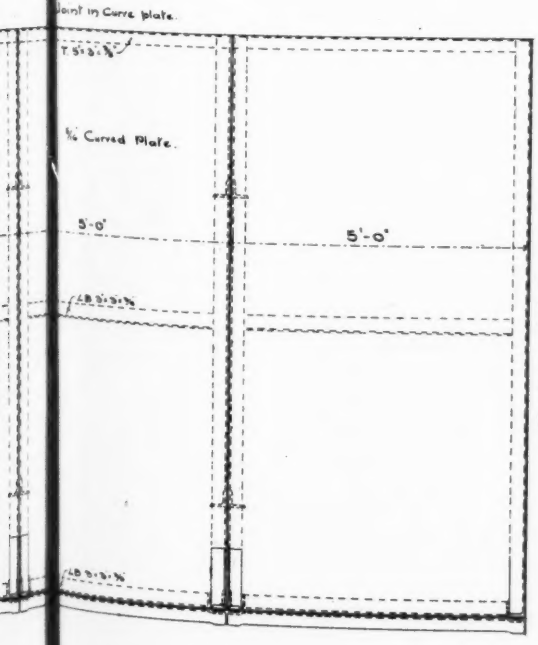

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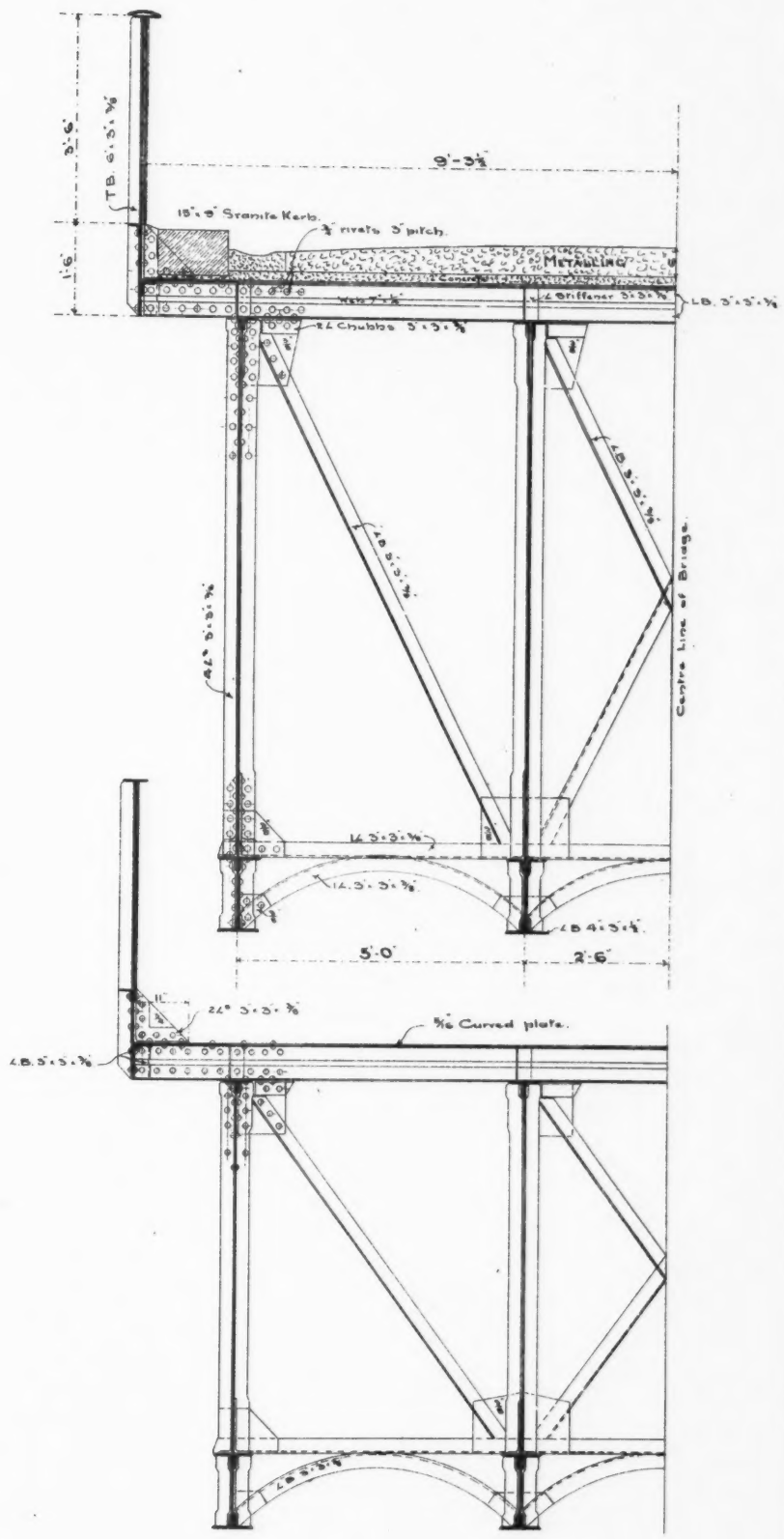

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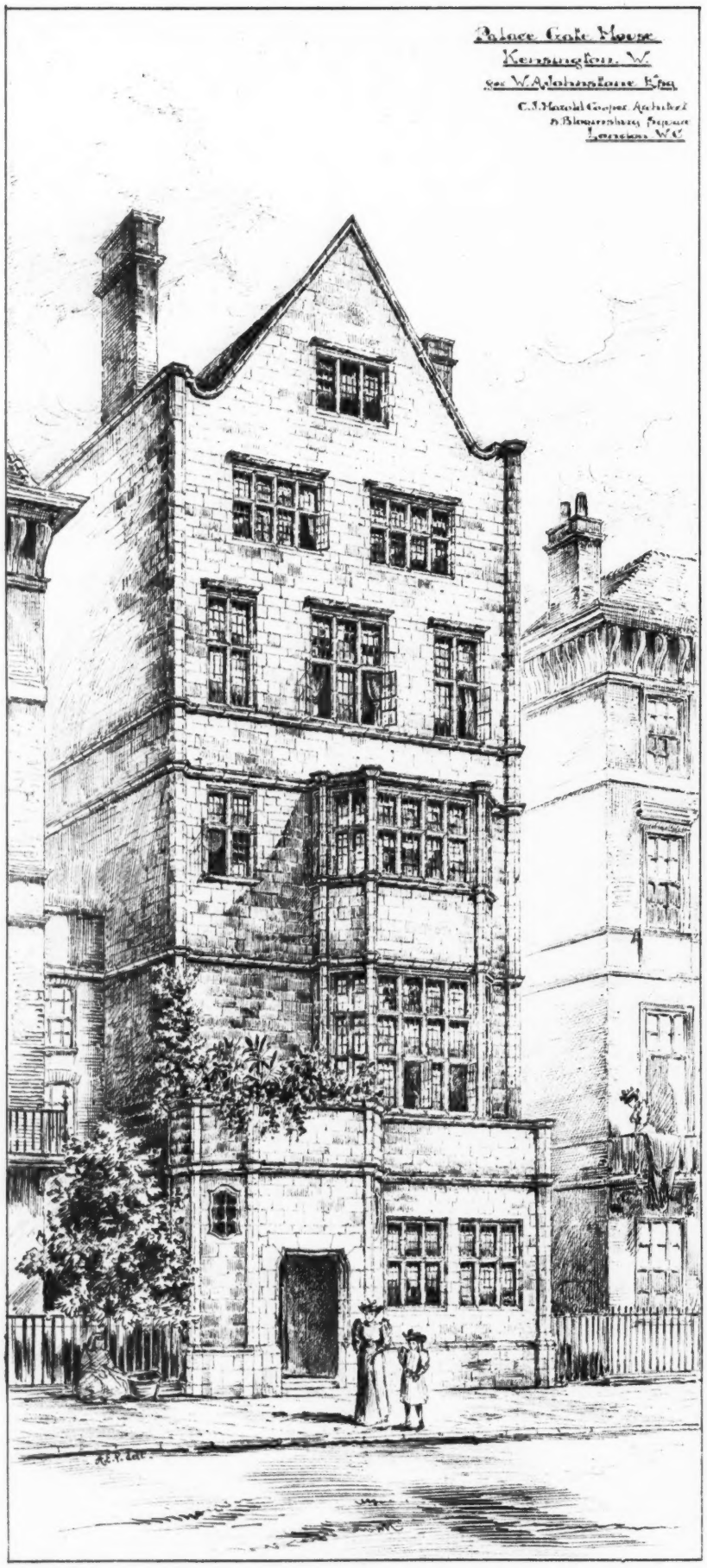
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Kensington. W.
for W. Ashbee Esq.
C. J. Marshall Cooper Architect
11 Bloomsbury Square
London. W.C.

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1896.
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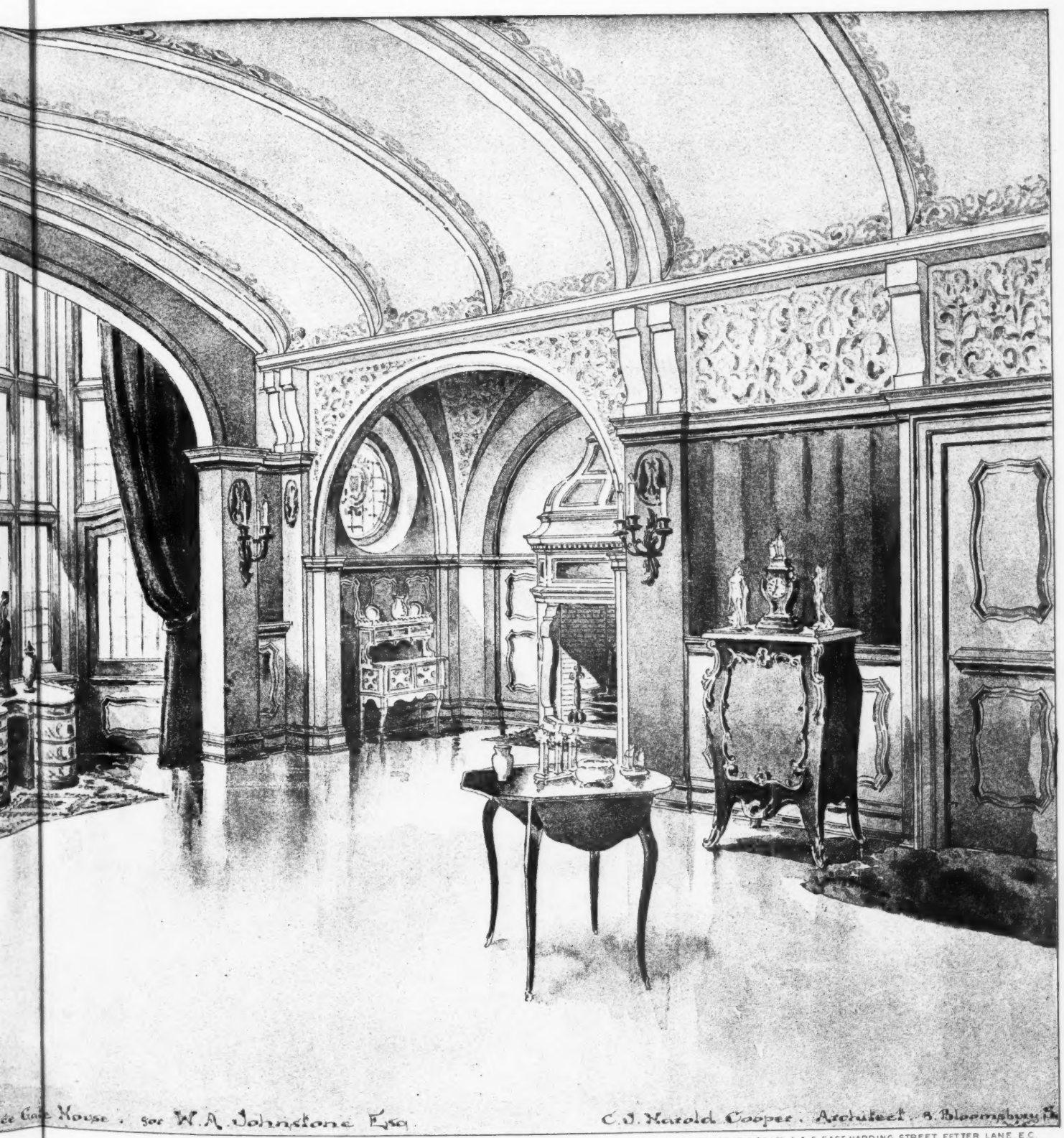

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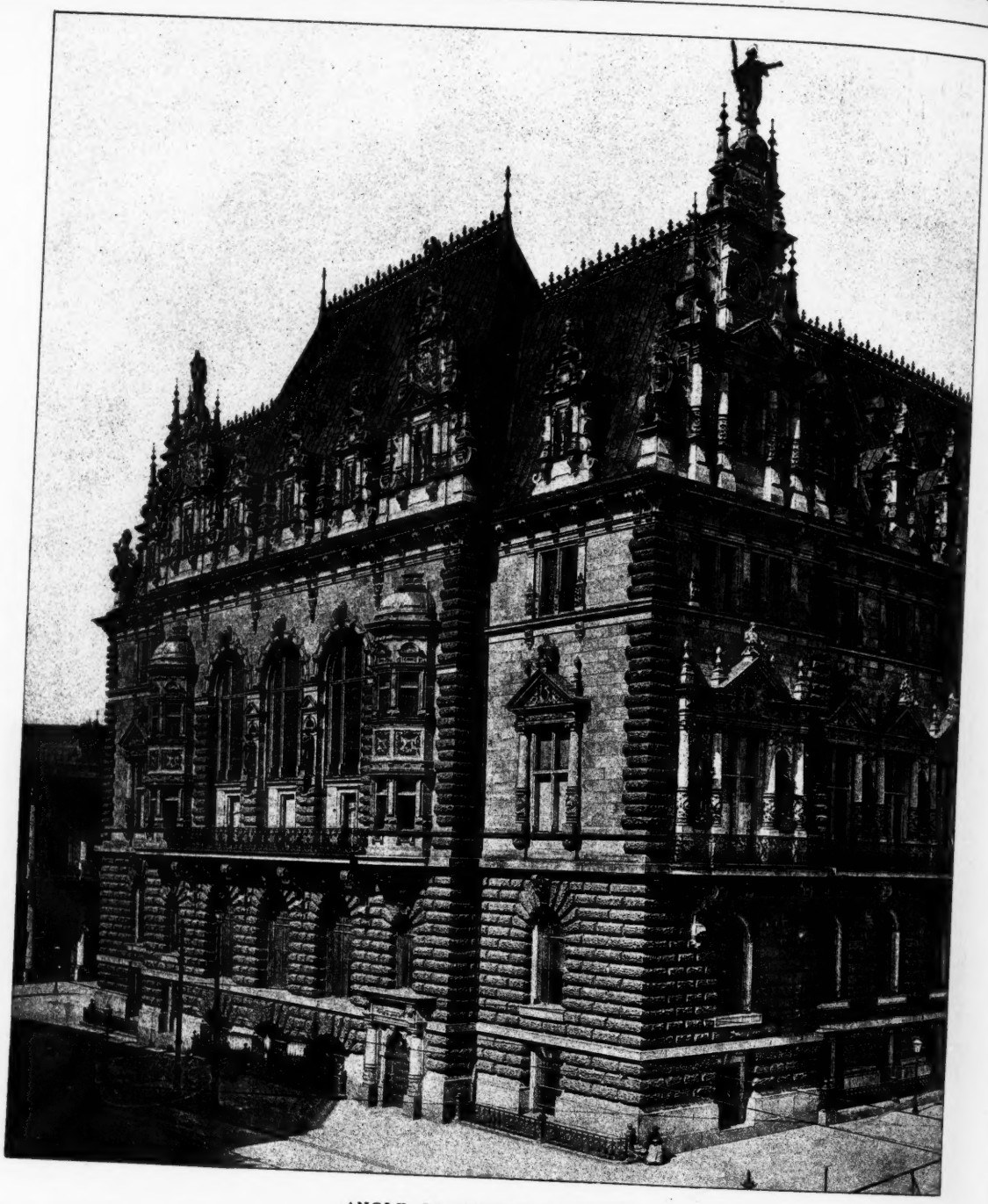
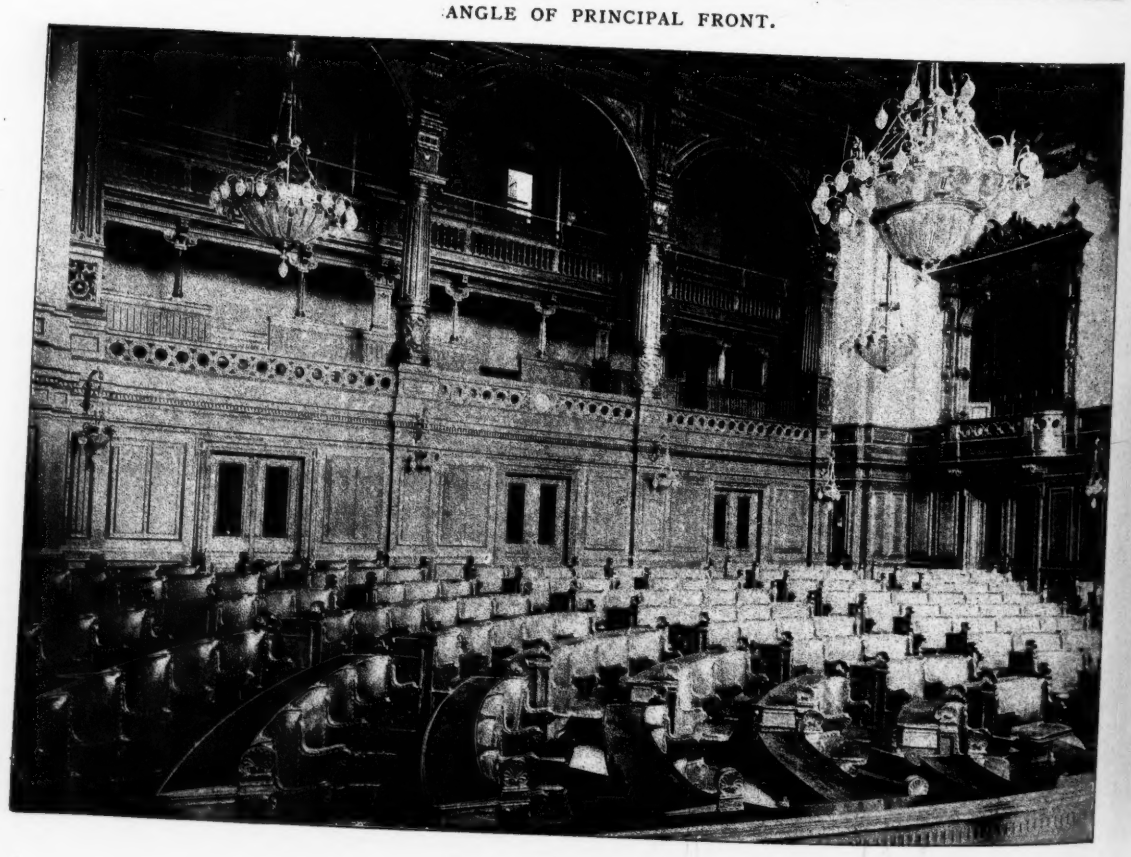


ANGLE OF PRINCIPAL FRONT.



THE COUNCIL ROOM.

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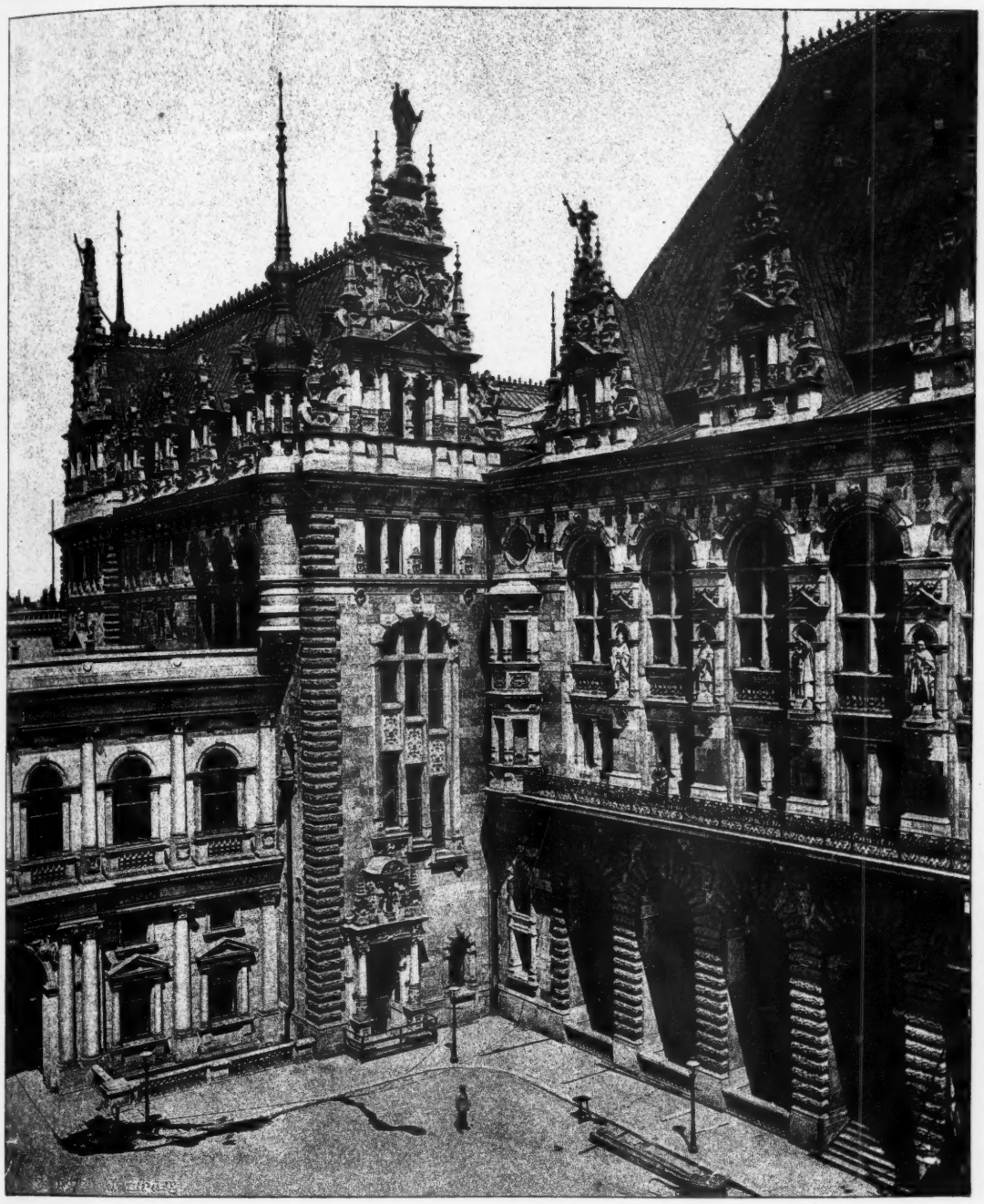
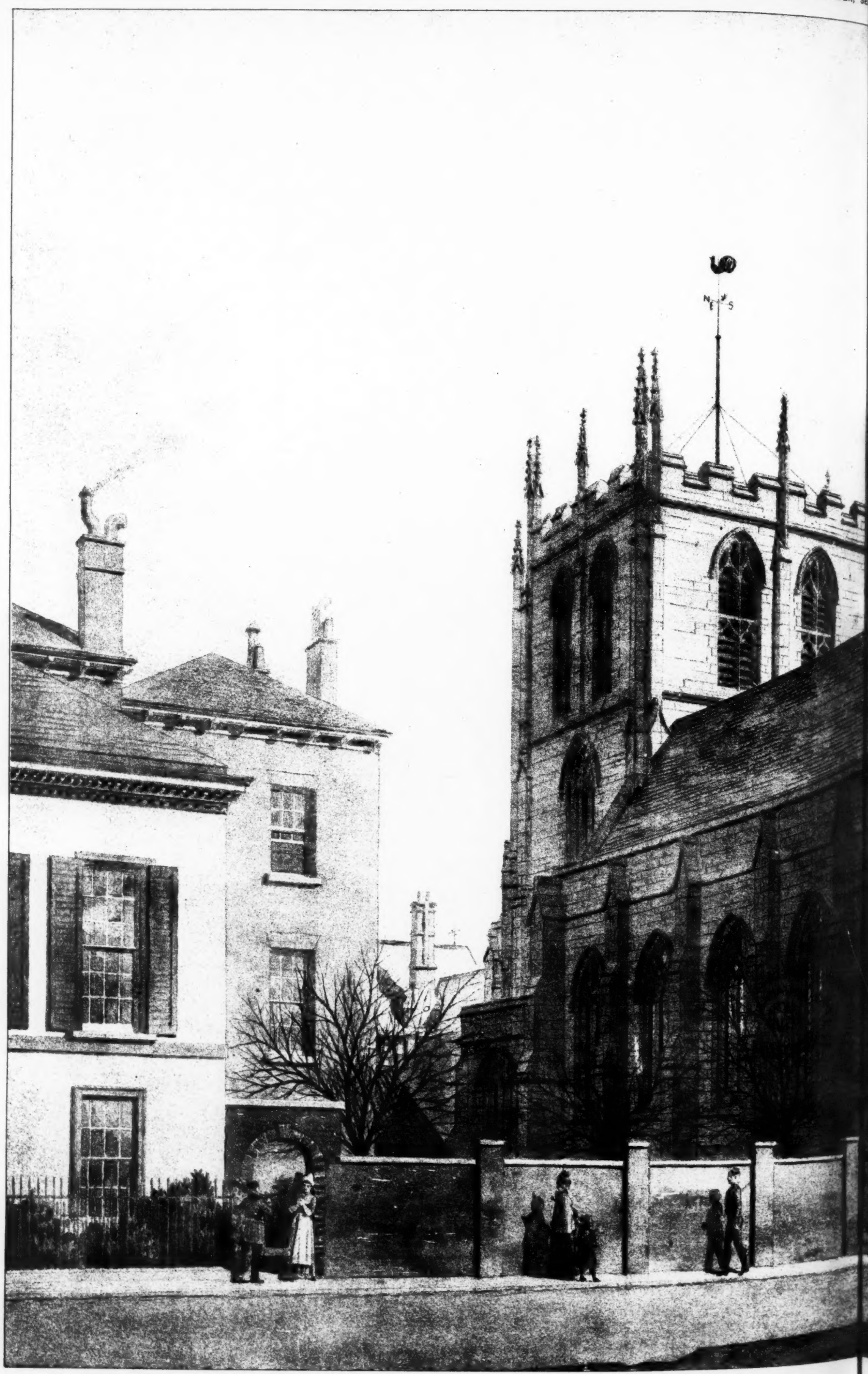


ANGLE OF COURTYARD.

THE RESTAURANT.

PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

IBURG N HALL.—Herr Grotjan, Architect.



CHURCH OF ENGLISH MARTYRS, YORK.—MESSRS.

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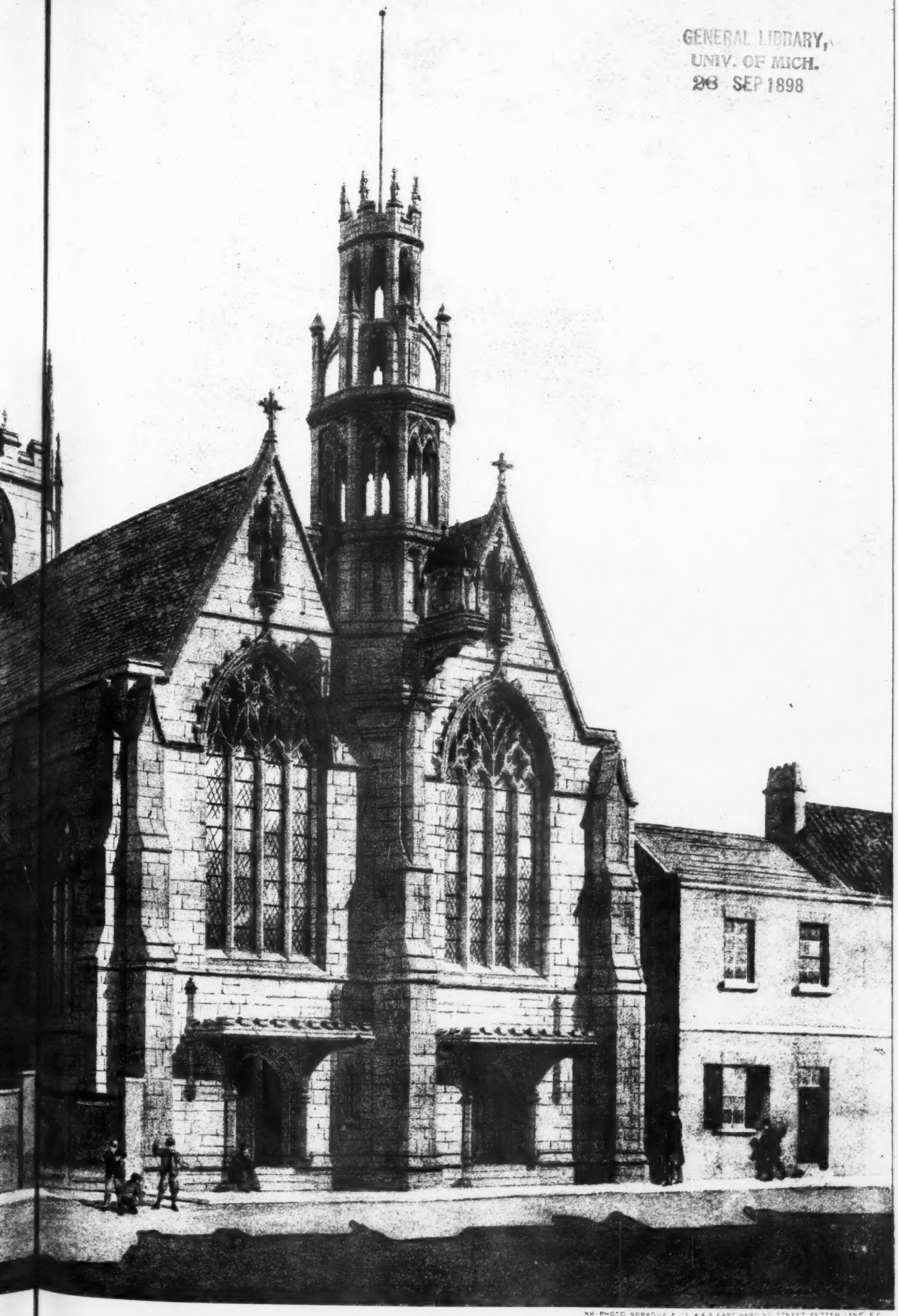

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, YORK.—Messrs. Goldie, Child & Goldie, Architects